The Veterinary Record

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 50. DECEMBER 12, 1936. VOL. 48.

General Articles

ANAEROBIC INFECTIONS OF SHEEP*

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It has long been realised that the anaerobic group of bacteria causes losses in sheep, for as long ago as 1888, Ivar Nielsen working in Norway, and in 1896, Jensen in Iceland, demonstrated that the disease "bradsot" which caused heavy annual losses in sheep in Scandinavian countries was associated with infection by the anaerobe, *Vibrion septique*. During the past 15 years or so much work in this country has been carried out in the investigation of the cause and prevention of losses in sheep and it has been clearly shown that anaerobes play a big part. I have been intimately concerned with many of these researches and it is for this reason that I have chosen this subject for my lecture to-day. Not only in this country but in many countries abroad has the rôle of anaerobes been proved in the causation of the commoner sheep diseases.

As far as this country is concerned, the four chief anaerobes responsible for diseases in sheep are, *B. chauvoei*, *Vibrion septique*, *B. welchii* and *B. oedematiens*. I will deal with the diseases produced by these micro-organisms and will then devote a final section to the methods of prevention which are in common use to-day.

A. B. CHAUVOEI.

It is well-known that blackleg, blackquarter or quarter-evil in cattle is caused by the invasion of the tissues, especially muscles, by *B. chauvoei*. Sheep also become affected with clinical blackleg in some districts and much discussion among observers has taken place regarding the causal micro-organism. It was held by some authorities that clinical blackleg in sheep was practically never associated with *B. chauvoei*, but that the invading organism was *Vibrion septique*, to which sheep are particularly susceptible. Bosworth, in 1930, in an article on blackleg quoted evidence that, in all probability, at least 70 per cent. of clinical blackleg in sheep was associated with the presence of *B. chauvoei* in the tissues and the other 30 per cent. with *Vibrion septique* and *B. welchii* chiefly. Infection by *B. chauvoei* in this country appears to be confined to certain areas and follows wounds, operations, etc., or may occur following injury of the ewe during lambing, as was shown by McEwen, in 1926, among sheep in the Romney Marsh district.

B. B. OEDEMATIENS.

In this country it was shown by McEwen, in 1931, that *B. oedematiens* was present in the lesions of sheep affected with clinical blackleg. He found the infection in five sheep from Wales and in one from the Romney Marsh. We know, of course, that *B. oedematiens* causes losses in sheep in other countries, *e.g.*, black disease in Australia, in which the organism is found in the liver, carried there in all probability by the liver fluke, and bradsot (braxy) in some parts of Central Europe in which the organism *B. gigas* (a strain of *B. oedematiens*—so called because of its large size) is the invading organism.

C. VIBRION SEPTIQUE.

Vibrion septique plays a big part in the causation of sheep diseases and is the responsible organism in braxy. It was at one time thought that *Vibrion septique* was probably the only anaerobe to which sheep were highly susceptible, but recent researches have shown that such is not the case. Nevertheless, its rôle in the causation of losses is important. Braxy has been recognised as a serious sheep disease in Scotland and parts of the North of England for generations and more recently it has been recognised in other parts of England and Wales. The disease affects sheep mostly during their first and second years of life and is characterised by sudden deaths; in fact, diseases which cause sudden deaths in sheep are often grouped under the term, "braxy-like diseases." The essential lesion in braxy is an inflammation of the abomasum and/or the small intestine. Apparently the *Vibrion septique* gives rise to these local lesions and then invades the body system generally. Braxy may cause only a few losses on any farm, but on the other hand, in some districts during the winter and early spring the losses may reach a figure of 30 or more per cent. In Scandinavian countries and Iceland the term "bradsot" is applied to the same disease. Certain areas of land seem to be more liable to braxy than others and it is the common practice to remove young sheep from the affected land during their first winter in order to cut down losses from braxy. Nielsen, in 1888, working in Norway, and Jensen, in 1896, working in Iceland, showed the association of *Vibrion septique* with bradsot. Professor Hamilton, working in Scotland (1906), con-

*Paper presented on the occasion of the centenary celebration of the Royal Veterinary College Medical Association, Camden Town, November 5th, 1936.

firmed that bradsot and braxy were the same disease and, although the technical methods in his day were somewhat crude, succeeded in isolating *Vibrion septique* from the carcases of sheep which had died of braxy. It was not, however, till the late Professor Gaiger, with whom I was associated, carried out his researches into braxy that the evidence was perfectly clear that *Vibrion septique* was the true cause of the disease. Gaiger's work on braxy will for ever stand out as classical. He realised early that anaerobes quickly invade the carcase of a dead sheep and that it was necessary to examine sheep killed at the height of infection in order to obtain reliable information regarding the causal organism. He therefore set up a laboratory in a "braxy" district and after painstaking observations showed that *Vibrion septique* could be recovered from the wall of the abomasum as it passed through into the general circulation. To Gaiger's original work on braxy and other sheep diseases, the sheep raising industry of this and other countries owes much.

It must be pointed out that the term "braxy" has been applied to diseases of sheep in this and other lands which are not associated with *Vibrion septique* infection, but now we recognise braxy as meaning infection by that anaerobe.

D. B. WELCHII GROUP.

Of all the anaerobes associated with diseases of sheep, the *B. welchii* group is undoubtedly the most important and a study of its members isolated from sheep has led to a complete revision, during the past ten years, of our conception of this group. It was long known that *B. welchii* could and did invade the tissues of sheep following wounds, etc., and on occasion could cause death. Recently we showed that losses in lambing ewes in Cornwall were caused by the invasion of the wall of the uterus following injury by the classical *B. welchii* or Type A as it is now called, much in the same way as some types of gas gangrene followed wounds in human beings and horses in the Great War from the action of the same organism. It was not, however, till investigations into a disease of lambs in Scotland—lamb dysentery—showed that an organism of the *B. welchii* group was concerned that much interest was taken in the group as a cause of sheep diseases. I have been much associated with the investigations into the part played by the group in sheep diseases and I feel that the evolution of our knowledge concerning this group of organisms may prove of interest. The group produces potent toxins and our studies of its members are largely concerned with the toxins and antitoxins.

The term entero-toxaemia is applied to the diseases set up by the group because it is found that, as a rule, the organism produces its toxin in the intestine and the toxin is absorbed from that region, causing death. The toxins can be demonstrated in the intestine.

Lamb dysentery—a disease now widespread in Scotland, England and Wales—affects young lambs during the first few days of life and may cause the deaths of 20 to 30 per cent. of the lambs. It is characterised by enteritis and in many cases by the formation of ulcers in the intestinal mucous membrane. At first it was believed to be caused by the action of specially virulent strains of *B. coli*, but in 1921 we were able to isolate from the intestinal ulcers and occasionally from other tissues, cultures of *B. welchii* and succeeded in reproducing the clinical disease in that year by feeding young lambs with cultures of the anaerobe and later by injecting small amounts of the culture intravenously. It soon became evident that the cultures of *B. welchii* we had isolated from lambs were different from the classical *B. welchii* found in lesions following wounds, etc. The difference lay in the fact that the antitoxin produced by the two organisms behaved differently, for while the antitoxin of the lamb dysentery cultures neutralised the toxins of both its own cultures and of classical *B. welchii*, the antitoxin of classical *B. welchii* had no power to neutralise the toxin of the lamb dysentery type. There were also other minor differences and it was decided to name the *B. welchii* isolated from lamb dysentery cases the lamb dysentery bacillus or *B. agni*. This was in 1928.

The next important observation on the group was made in 1930, by McEwen, who described a disease in sheep on the Romney Marsh referred to as "struck." From the intestine and tissues of affected sheep a type of *B. welchii* was isolated and a study of the culture in the laboratory showed differences from classical *B. welchii* and from the lamb dysentery bacillus —McEwen named the organism *B. paludis*. He was able to reproduce clinical "struck" by the feeding of large quantities of cultures of *B. paludis*. In connection with *B. paludis*, though there were some differences between it and the lamb dysentery bacillus, work carried out at the Wellcome Laboratories showed that the toxin produced by *B. paludis* was neutralised by lamb dysentery antitoxin.

The next observations came from Australia, New Zealand and Tasmania, where Bennetts, Gill and Oxer respectively, demonstrated in the intestine of lambs suffering from pulpy kidney disease a toxin producing organisms of the *B. welchii* type. Pulpy kidney disease is so called because of the state of the kidney found in lambs dying when a few weeks old. Lesions also occur in other tissues, specially in the heart. Again this organism differed in some respects from those already described and Bennetts named it *B. ovitoxicus*. Work by

Montgomerie and Rowlands, in N. Wales, resulted in the finding of the same organism in the intestine of lambs affected with pulpy kidney disease in that district. (These workers have taken a large part in the investigations of sheep diseases caused by the *B. welchii* group). The investigations of Wilsdon now come into the story. In a paper published in 1931 Wilsdon suggested that the *B. welchii* group consisted of four different types of organisms which he named A, B, C and D, according to the results of toxin-antitoxin neutralisation tests. He showed that there was an overlapping of the toxins produced by the various types. Further work on the toxins and antitoxins was carried out at the Wellcome Laboratories and it now became evident that the various toxins are produced in varying amounts depending on the conditions under which the cultures are grown. One of the most interesting points demonstrated lately is the fact that a strain may lose its power of producing permanently a type of toxin. Montgomerie power of producing a type of toxin. Montgomerie and Rowlands have demonstrated that a disease of adult sheep referred to as "strike" was associated with the presence of *B. ovitoxicus* and that in other cases of sudden death of ewes *B. paludis* was found.

The position, therefore, to-day regarding the *B. welchii* group of organisms in relation to sheep disease is as follows:—

(1) Relationship to Disease.

Type A.—Causes gas gangrene following wounds, etc. Shown to be responsible for losses in ewes following lambing.

Type B. (lamb dysentery bacillus—*B. agni*).—Causes lamb dysentery in all districts.

Type C. (*B. paludis*).—Causes "struck" in Kent. Has been found in N. Wales. Described as occurring in sheep in France, Turkey and Greece.

Type D. (*B. ovitoxicus*).—Causes pulpy kidney disease in England, Australia, New Zealand and Tasmania. Has also been described in America. Found in ewes in N. Wales and in Scotland.

(2) Toxins of the B. welchii Group.

Five toxins have been described and are denoted as α, β, γ δ, ϵ.

They are found as follows:—

Culture Types	α	β	γ	δ	ϵ
A.	+	−	−	−	−
B.	+	+	+	±	+
C.	+	+	+	+	−
D.	+	−	−	−	+

(3) Toxin-Antitoxin Neutralisations According to Type.

Culture	*A.*	*B.*	*C.*	*D.*
A.	+	+	+	+
B.	−	+	−	−
C.	−	+	+	−
D.	−	+	−	+

Undoubtedly the most interesting type is type B—the organism found in lamb dysentery. You will observe from the tables that this organism produces all the types of toxin recognised in the *B. welchii* group and that from it can be produced antitoxin which will neutralise any or all of the toxins and prevent infection by the various types of the group.

Much research has been carried out into this type. The various toxins it produces can be demonstrated in the intestine of lambs affected by lamb dysentery and they are produced *in vitro*. It is of interest to note that the amount of the various toxins produced by this type varies very much according to the methods of cultivating the organism artificially.

There is as yet no evidence to show whether the various types of the *B. welchii* group have a common origin or whether they are essentially different. The fact that the B or lamb dysentery type produces all the recognised toxins while others only produce one or several of the toxins seems to suggest that the B type is the common stock variety and that the other types have, due to environment, etc., lost their power to produce the multiple toxins and have become stabilised in that condition. In support of this theory is the fact that we have in our possession now a type B which has become a type C, *i.e.*, it has entirely lost its power to produce the ipsilon (ϵ) type of toxin. Again, in the intestine of lambs affected with typical lamb dysentery the types of toxin present vary considerably. In some cases all types can be demonstrated while in others one type only is found; yet cultures from the contents show the presence of the B type of *B. welchii*. It might be argued that we have all the time been working with mixed cultures containing the various types. This, however, is not the case for, thanks to our former co-worker Mason, we have had at our disposal cultures derived from single cells of the various types and the same results have been obtained.

These are our views at the moment. It may be that as work progresses further types of toxin will be demonstrated, or more delicate methods will be devised for the detection of toxins and may cause us to alter these views.

Each toxin is characteristic from a disease production point of view. We do not yet understand the factors in nature which determine the nature of the toxin produced by the group. An interesting piece of research could be devised in this connection.

Prophylaxis

In addition to alteration in the methods of sheep husbandry, the use of vaccines and serums is resorted to in the prophylaxis of the various anaerobic infections.

Vaccines.—Vaccines are prepared in different ways and consist of the following types:—

(*a*) Spores or attenuated cultures.
(*b*) Natural aggressins—*i.e.*, the muscle juice of animals artificially infected with the anaerobe.
(*c*) Culture filtrates, *i.e.*, toxins.
(*d*) Toxin-antitoxin mixtures.
(*e*) Toxoided toxins.
(*f*) Toxoided cultures.

Most of these types of vaccine have been used in the prophylaxis of the various diseases.

B. chauvoei.—Spores, etc., contained in the form of threads, cords or pellets, have been largely used. Natural aggressins are often used, especially in America. In this country Allen and Bosworth showed that the culture filtrate was a successful immunising agent and McEwen demonstrated that toxoided cultures gave a high degree of protection.

Henderson has shown that the "O" antigen, *i.e.*, boiled bacilli, protects laboratory animals against infection with large doses of virulent organisms.

Vibrion septique.—Gaiger used culture filtrate in his experiments and showed that the death rate could be reduced from about 10 per cent. in untreated sheep to about 4 per cent. in those injected on two occasions. We have used toxin-antitoxin mixture and toxoided cultures and have found that the latter gives the better results. As a rule only one dose is given, but if the district is specially liable to braxy then two doses are necessary. In Iceland, Dungal also uses a toxoided culture.

B. welchii Group.—In connection with lamb dysentery we showed early in our researches that the injection of the ewe with vaccine made from the lamb dysentery bacillus was a method of protecting the lamb. A series of experiments proved that in the immunised mother sheep the antibodies produced did not pass into the lamb *in utero* but accumulated in the udder so that the colostrum was rich in the antibody. Thus, a lamb at its first suck partook of the antibodies which were rapidly absorbed into the blood stream through the intestinal wall. This method of prophylaxis is largely carried out to-day. We have used toxin-antitoxin mixture and toxoided culture: the latter is the more efficient. In ewes inoculated for the first time two doses are given, one in the autumn and another near lambing time, but in future years the spring injection only is required to cause a sufficient increase in the antibody content of the colostrum.

In lamb dysentery immunisation the vaccine naturally must contain antigens for the production of all the types of antitoxins known in the *B. welchii* group.

In the prevention of pulpy kidneys Dayus in Australia has used a vaccine on the mother sheep prepared from *B. ovitoxicus* only and reduced the death rate in the lambs from 7 to 0·24 per cent.

Serum.—In this country serum is also largely used in the prevention of lamb dysentery. It is injected soon after birth into the lambs and is a convenient method of preventing the disease when lambs are born under conditions which allow of their being handled early in life. The results are highly successful, but in the prevention of lamb dysentery the serum must contain all the antitoxins produced by the *B. welchii* group. On a certain occasion some years ago when the cultures with which we were working lost their power of producing certain toxins, the field results following the use of serum were in some districts poorer than usual. This was probably due to the lack of an antitoxin to neutralise one of the toxins produced in the intestine by the lamb dysentery bacillus.

In connection with pulpy kidney disease, antitoxin produced from the toxins of *B. ovitoxicus* is useful. Montgomerie made the shrewd observation, even before we understood the relationship of the various toxins, that in districts in which lamb dysentery serum was used the incidence of pulpy kidney disease fell considerably. It would appear, therefore, that a mixed serum containing the various antitoxins of the *B. welchii* group will protect lambs against the various entero-toxaemias.

GRASSLAND IN GREAT BRITAIN

At a meeting of the Engineers Study Group on Economics held on November 10th, Professor R. G. Stapledon discussed methods of dealing with the problem of grassland in Great Britain. He exhibited a map of Wales, the result of a recent survey, and pointed out that there are only 16,000 acres of proper pastures (rye grass), although at least a third of the 153,000 acres under bracken is of high potential value. To make the best use of the 18,000,000 acres of rough hill grazing ground in Great Britain, Professor Stapledon considers that it is necessary for the State to acquire and develop it. This, he believes, would be economically feasible over a period of 25 to 50 years, beginning at once with an area of not less than 200,000 acres. Agriculturally, the potentialities of the hill land not above the 150 feet contour (in all, more than 14,500,000 acres) are enormous, at least 20 per cent of that area being amenable to radical improvement. Lowland grass could be used for drying and for wintering, and improved upland grass for summering, and the plough, oats and fatting crops everywhere. Roads and tracks should be constructed in connection with land improvement and afforestation. Sir Richard Paget, who presided at the meeting, expressed his appreciation of the pioneer work of Professor Stapledon, and Lord Northbourne, in opening the discussion, stressed the importance of preserving individual initiative.

THE EFFICIENCY OF COMMERCIAL LAMB DYSENTERY SERUM

by

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Since lamb dysentery was first diagnosed in North Wales, in 1926, its prevention by the injection of the new-born lamb with "lamb dysentery serum" has been under constant observation. In the earlier years well-controlled field trials clearly demonstrated that the injection of serum within twelve hours of birth regularly afforded complete protection. Thereafter, serum came into general field use and proved highly successful until the spring of 1933. In that season numerous instances of its failure were observed. This led to an investigation* which showed that *Cl. welchii*, Type B (the lamb dysentery bacillus) produces a very complex toxin in which there are two chief fractions; the one neutralised by *Cl. welchii*, Type C (*B. paludis*) antitoxin and present in high concentration during the early period of incubation but rapidly deteriorating; the other neutralised by *Cl. welchii*, Type D (*B. ovitoxicus*) antitoxin present in low concentration during the early period of incubation, increasing as incubation is prolonged and relatively stable. It could, therefore, be said that efficient lamb dysentery serum must contain antitoxin capable of neutralising both of these toxic fractions and it was shown that the serum issued in 1933, while it contained antitoxin of the C type in high concentration, contained little or none of the D type. The failures of that season were ascribed to this deficiency.

*Montgomerie, R. F., and Rowlands, W. T. (1934.) *Vet. J.* **90**. pp. 323-337.

Subsequently, this omission having been made good, lamb dysentery serum gave very satisfactory results both in trials and in general field use. Until recently practically all the serum used in England and Wales was prepared at the Wellcome Physiological Research Laboratories but lately other laboratories have taken up its preparation and some "lamb dysentery serum" is imported from the Continent.

During the 1936 lambing season it became evident that some of the more recently introduced preparations being sold as "lamb dysentery serum" failed to control the disease in the field and it was decided to determine the relative efficiency of the various brands of serum offered for sale in this country. For this purpose a small quantity of each of five brands of "lamb dysentery serum" was purchased through the usual channels. Of these, the brands labelled in the laboratory Nos. 1 and 2 were prepared in England and Nos. 3, 4 and 5 were imported from the Continent.

A preliminary observation designed to determine how far each of these sera was capable of neutralising the toxin produced by *Cl. welchii*, Wilsdon Type B (the lamb dysentery bacillus) in all its growth phases was undertaken. A bottle of Robertson's meat medium was inoculated with a freshly isolated strain of the organism and a sample of the toxin produced after 16 hours, after three days and after ten days incubation withdrawn for test. The minimum lethal dose (M.L.D.) of each of these was determined by intravenous injection into mice. Varying amounts of each brand of serum were mixed with the test dose of toxin (ten M.L.D.) and saline added to give a constant volume. The mixtures were incubated for half-and-hour at 37° C. and, thereafter, injected intravenously into mice, neutralisation of the toxin being determined by survival beyond 24 hours.

Table No. 1 details the results obtained which demonstrated that there were wide differences

Table I.

Neutralisation of 10 M.L.D. *Cl. welchii*, Type B toxin produced after 16 hours, 3 days and 10 days incubation.

Amount of Serum in c.c.	Brand of Serum.														
	No. 1.			No. 2.			No. 3.			No. 4.			No. 5.		
	16 hrs.	3 days.	10 days.	16 hrs.	3 days.	10 days.	16 hrs.	3 days.	10 days.	16 hrs.	3 days.	10 days.	16 hrs.	3 days.	10 days.
0·5	L.L.	L.L.	L.L.	L.L.	L.D.	D.D.	L.L.	L.L.	L.L.	D.D.	D.D.	D.D.	D.D.	D.D.	D.D.
0·1	L.L.	L.L.	L.L.	L.L.	D.D.	D.D.	L.L.	L.L.	L.L.	D.D.	D.D.	D.D.	D.D.	D.D.	D.D.
0·05	L.L.	L.L.	L.L.	L.L.	D.D.	—	L.L.	L.L.	L.L.	—	—	—	—	—	—
0·01	L.L.	L.L.	L.L.	D.D.	—	—	L.L.	D.D.	L.L.	—	—	—	—	—	—
0·005	L.L.	L.L.	L.L.	D.D.	—	—	L.L.	D.D.	L.D.	—	—	—	—	—	—
0·001	L.L.	D.D.	D.D.	—	—	—	L.L.	—	D.D.	—	—	—	—	—	—
0·0005	L.L.	D.D.	D.D.	—	—	—	L.L.	—	D.D.	—	—	—	—	—	—
0·0001	D.D.	—	—	—	—	—	D.D.	—	—	—	—	—	—	—	—

Two mice used in each test; L = lived. D = died.

in the efficiency of the sera under test. While some (Brands 1 and 3) were of high efficiency, others (Brands 4 and 5) appeared to possess no neutralising power whatsoever.

It was, therefore, decided to make a more detailed examination of the sera and to determine their ability to neutralise each of the two chief toxic fractions of *Cl. welchii*, Type B. Small quantities of precipitated dried toxin of *Cl. welchii* Type C and of *Cl. welchii*, Type D, which had kindly been supplied by the Wellcome Physiological Research Laboratories, were used for this work. The toxins were separately dissolved in saline so that in each case the M.L.D. on intravenous injection into mice was 0·001 c.c. The ability of the various brands of serum to neutralise these toxins was determined, using the technique outlined above.

Tables Nos. 2 and 3 detail the results obtained when the test dose was ten M.L.D. Since, however, certain of the sera contained very little antitoxin their value could not be determined by the use of such a large test dose. The observation was, therefore, repeated using two M.L.D. and the results are set out in Tables Nos. 4 and 5.

This work clearly demonstrated the superiority of the Brand No. 1, for 0·0003 c.c. neutralised ten M.L.D. of Type C toxin and 0·002 c.c. neutralised ten M.L.D. of Type D toxin. Brand No. 2 fell very far short of that standard since 0·005 c.c. were required to neutralise two M.L.D. of Type C toxin and 0·6 c.c. to neutralise two M.L.D. of Type D toxin. Of the brands of foreign origin No. 3 had an efficiency, in respect of both toxins, not far short of the British Brand No. 1 but the other two appeared to contain no detectable antitoxin of either type. The results can best be illustrated by expressing the values of the various sera in units. Unfortunately, no officially accepted standard exists. If, however, an arbitrary standard be chosen and the amount of antitoxin capable of neutralising ten M.L.D. of the test toxin be taken as one unit, the following comparison is possible:—

Brand.	Units of antitoxin per c.c.	
	Type C.	Type D.
1	3,000	500
2	40	>1
3	2,000	100
4	Nil	Nil
5	Nil	Nil

Discussion.

With the increasing prevalence of lamb dysentery, biological preparations for its prevention now occupy an important position among animal prophylactics in use in this country. It is essential, therefore, from all points of view, that such serum be efficient.

Work of recent years has clearly demonstrated that efficient lamb dysentery serum must be capable of neutralising the toxin produced by *Cl. welchii*, Type B in all its growth phases. It is evident that the commercial production of such a serum presents no unsurmountable difficulty. It is fundamental, however, that the antigen be

Table II.

Neutralisation of 10 M.L.D. *Cl. welchii*, Type C toxin.

Amount of Serum in c.c.	Brand of Serum.				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
0·01	L.L.	D.D.	L.L.	D.D.	D.D.
0·005	L.L.	D.D.	L.L.	D.D.	D.D.
0·001	L.L.	—	L.L.	—	—
0·0005	L.L.	—	L.L.	—	—
0·0003	L.L.	—	D.D.	—	—
0·0002	D.D.	—	D.D.	—	—

Table III.

Neutralisation of 10 M.L.D. *Cl. welchii*, Type D toxin.

Amount of Serum in c.c.	Brand of Serum.				
	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.
0·1	L.L.	D.D.	L.L.	D.D.	D.D.
0·05	L.L.	D.D.	L.L.	D.D.	D.D.
0·01	L.L.	—	L.L.	—	—
0·005	L.L.	—	L.D.	—	—
0·002	L.L.	—	D.D.	—	—
0·001	D.D.	—	D.D.	—	—

Table IV.

Neutralisation of 2 M.L.D. *Cl. welchii*, Type C toxin.

Amount of Serum in c.c.	Brand of Serum.		
	No. 2.	No. 4.	No. 5.
0·6	L.L.	D.D.	D.D.
0·3	L.L.	D.D.	D.D.
0·1	L.L.	—	—
0·05	L.L.	—	—
0·01	L.L.	—	—
0·005	L.L.	—	—
0·003	D.D.	—	—
0·002	D.D.	—	—

Table V.

Neutralisation of 2 M.L.D. *Cl. welchii*, Type D toxin.

Amount of Serum in c.c.	Brand of Serum.		
	No. 2.	No. 4.	No. 5.
0·6	L.L.	D.D.	D.D.
0·3	D.D.	D.D.	D.D.
0·2	D.D.	—	—
0·1	D.D.	—	—

prepared from a recently isolated strain of the lamb dysentery bacillus, since it has been shown that with continued long sub-cultivation at least some strains lose their power to produce toxin of the D type. When strains of the latter type are used an inefficient serum results. It was the use of such a strain which led to the failures of 1933 and, apparently, to the deficiency in antitoxin of the D type in Brand 2.

So far as the value of the sera in the field is concerned, only the Brands Nos. 1 and 2 have been extensively employed in North Wales. Brand No. 1 had an excellent record, for in 1936 no instance of death from dysentery was reported where the lamb had been inoculated in the manner recommended. Numerous instances of the failure of Brand No. 2 were, however, investigated. In the great majority of cases the inoculated lambs survived until six to twelve days old, the disease was subacute and extensive necrosis of the bowel wall, rather than discrete ulceration, was the common *post-mortem* lesion. This appears to be the type of dysentery which occurs in lambs inoculated with a D-deficient serum. It can be assumed that the foreign Brand No. 3 would give quite satisfactory results in the field but the remaining Brands Nos. 4 and 5 could afford no protection whatever. In fact, these latter sera would appear no different from normal serum and one is forced to the conclusion that there had been issued as "lamb dysentery serum" material which could make no claim to such a title.

This investigation has brought to light a position which might well bring discredit on lamb dysentery prophylactics and, in fact, prophylactics generally. Furthermore, sound professional diagnosis and advice may readily be brought into disrepute by the use of one of these inefficient brands of lamb dysentery serum. The financial loss to the agricultural community may be serious. Since the incidence of dysentery is often low during the early part of lambing, serum failure may not be evident until lambing is in full swing. Then, with the presence of a large proportion of susceptible lambs, if inefficient serum has been used, the loss may reach alarming proportions.

It does appear remarkable that serum which can make no pretence at efficiency—being apparently devoid of the necessary antitoxins—can be sold as lamb dysentery serum and this brings one face to face with the question of the control of such biological products. It would seem that the Diseases of Animals Act, 1935, Part II might be invoked for this purpose for it prescribes means whereby the manufacture for sale and the importation of such material may be regulated by licence and standards of efficiency made compulsory. While sufficient knowledge may not yet be available to fix a definite standard as to the units of antitoxin, it can certainly be said that the standard as to the type of antitoxin to be contained in lamb dysentery serum is evident.

SUMMARY

(1) The antitoxic value of five commercial brands of "lamb dysentery serum," two of British and three of foreign origin, was investigated.

(2) One British and one foreign brand contained antitoxins capable of neutralising the toxin produced by *Cl. welchii*, Type B (the lamb dysentery bacillus) in all its growth phases.

(3) One British brand was distinctly deficient in antitoxin capable of neutralising one of the main toxic fractions of *Cl. welchii*, Type B and two foreign brands contained no detectable antitoxin.

(4) It is concluded that three of the five brands were quite unsuitable for the control of lamb dysentery in the field.

TYPE CULTURES OF MICRO-ORGANISMS

An announcement that the Medical Research Council has issued a fourth edition of the Catalogue of the National Collection of Type Cultures, maintained at the Lister Institute of Preventive Medicine, Chelsea Bridge Road, London, S.W.1. (*Special Rep. Series.* No. 214. London: H.M. Stationery Office, 2s. 6d. net) is made in a recent issue of *Nature*, which states: "Five years have elapsed since the publication of the third edition of the Catalogue, and during this period a large number of species of bacteria and micro-fungi have been added to the collection. In the present edition, the generic name *Bacillus* has been restricted to the spore-bearing rods, aerobic and anaerobic. Most of the non-sporing rod-forms are listed under *Bacterium* except where well-recognised generic names are in common use, for example, the diphtheroids (*Corynebacterium*) and the organisms of undulant and abortus fevers (*Brucella*). The typhoid and para-typhoid bacilli and food poisoning organisms are, however, placed under *Salmonella*, and the dysentery bacilli under *Bacterium*. It is pointed out that nomenclature is in a state of flux, and is now being considered by two or three committees. In respect of both bacteria and fungi, a number of synonyms is given for the convenience of those more familiar with the older systems of nomenclature. In addition to bacteria, yeasts, micro-fungi and *Actinomyces*, several strains of bacteriophage, and a few Protozoa and viruses are also stocked. Cultures may be obtained for a small fee on application to the Curator. In order to increase the services that may be rendered to microbiologists, it is requested that cultures be forwarded to the Curator, not only those of newly isolated species, but also fresh examples of types at present conserved in the collection."

PROGNOSIS AND THERAPEUTIC PRINCIPLE

We may derive some consolation, in reflecting as we often do upon our own shortcomings in the veterinary profession, by taking heed of the outspoken comments passed by one of the most distinguished modern clinicians in the medical profession upon several methods of treatment that find vogue in the treatment of the human subject. That in the ordinary round of general practice much that is applied, in ignorance, through cupidity, or to gratify the credulity of the client, amounts to little more than mere humbug cannot, it would seem, be laid to the charge of the veterinary surgeon any more than it can, with much reason, if we accept the tenor of Professor Ryle's searching criticism, to the medical practitioner.

It has sometimes occurred to me, said Professor J. A. Ryle, M.D., F.R.C.P., Regius Professor of Physics in the University of Cambridge, in the Annual Oration to the Reading Pathological Society, on October 22nd last, to wonder with what criticism a man of scientifically judicial mind would head his list if called upon to scrutinise and report upon the daily work of doctors. Perhaps, he continued, we may safely assume that our method or lack of method in therapeutics would at least receive prominent censure. Even after allowing for the difficulties under which we work, the rushed and frequently exhausting condition of our lives, and the complexity and variability of our human material, we must confess that modern therapeutics in practice are still sadly lacking in system; that many of us are curiously uncritical and susceptible to the blandishments of the proprietary chemist; that we are pessimistic sometimes, but as hopeful often about the new remedy or operation as the untutored laity, and as slow almost to distinguish between *post* and *propter* in assessing the results of treatment.

Vogues in treatment come and go, introduced without experimental justification, and accepted without the application of any crucial test, without comparisons between a treated and untreated series, without enquiries into mode of action or even a display of curiosity as to whether the remedy includes an active principle at all. Sometimes, even, harmful treatments flourish for a time. The others exhibit a waning curve of popularity, and early exalted claims suffer a gradual extinction with little attendant commentary or reflection on the time and money wasted and the disappointed hopes. We should be very shy of meeting members of other scientific professions but, in point of fact, in matters therapeutic, and particularly when they themselves are the patients, even eminent scientists are sometimes as gullible as we are.

Is it some survival of the old association of ideas between medicine and magic that allows this state of affairs to continue? Many patients would still seem to believe (and we are not, as a rule, at pains to correct them) that we have hidden powers of healing, and that our medicines, vaccines, rays, and operations, and our psychiatric jargon are expressions of a magical wisdom which recent science has only served to exalt or modify. Actually, of course, we are concerned with highly complicated physical, chemical, and psychological adjustments, and our powers, though ever extending, are still strictly limited. The *vis medicatrix naturae* does, and will always do, far more for our patients than we can.

These self-criticisms notwithstanding, there is no real cause for despondency. Through physiology and pathology and clinical observation our understanding of the *vis medicatrix* continually enlarges, and we become better able to condition the lives and actions of our patients and to apply mechanics, remove diseased parts, and prescribe drugs and regimen to their advantage. From time to time a great discovery, based usually on experiments, gives us a new advantage. The benefits conferred by Pasteur and Lister are immeasurable. Rickets and scurvy, small-pox, typhoid, and diphtheria, even syphilis and tuberculosis, are preventable and coming under our therapeutic control. Acute abdominal diseases and many chronic surgical conditions are far less dangerous and disabling than they were. Surgery and radium have in some degree lessened the menace of cancer. Myxoedema, pernicious and other severe anaemias, and diabetes can be efficiently countered. Malaria and amoebic dysentery have their answers. Pyschology is beginning to make a more genuine and useful contribution to healing. Anaesthesia has developed out of recognition. The relief of pain and of many other symptoms is becoming rationalised even when cure is still impossible.

What a pity that, in parallel with these advances, we should have to record credulities and empiricisms and follies in therapeutic fashion by the score.

In the last quarter of a century we have witnessed the therapeutic vaccines craze based, not on experiment and the vast experience of war-time as in the case of Wright's prophylactic anti-typhoid vaccine, but on haphazard speculation and ill-considered enterprise. Organisms isolated from the throat, dental sockets, stools, and elsewhere, and hailed as the cause of the rheumatism, the catarrh, the colitis (and sometimes of the undiagnosed anaemia, cancer, tuberculosis, or gout) have been injected in various combination in their millions of millions —the prescription being at last discontinued when it failed or the patient, after months or years, got better in spite of it. The polypharmacy of the Middle Ages was no more absurd. "Endocrines," "rays," exploitations of surgical

procedure, injections of chemical substances vaunted to cure influenza and pneumonia, intravenous chemotherapy for septicaemia, have all been allowed to have their day. In each case it has been the same story. The treatment has been launched with no adequate preliminary experiment, without controls, without clinical trials, and employed without criticism and often, alas, without an adequate diagnosis and to the exclusion of a rational conservative therapy, which, although not miraculous in its effects, at least has the virtue of encouraging or not delaying natural recovery.

Most treatments of the kind I am criticising, went on Professor Ryle, are aimed at chronic diseases of variable duration and commonly with a tendency to remission or slow natural recovery. As Gull said: "Medicines do more good when there is a tendency to recovery without them." The remissions and recoveries give the upholders of the treatment their opportunities to "claim results." They are never true students of disease. But unless we study disease and its natural variations, how can we ever accept that variations occurring during a treatment are due to it? Other debatable treatments are concerned with acute and alarming illnesses. Here anxiety and a disinclination to dispense with anything which "might do good" provide the common impulses to the employment of the remedy. I have frequently mentioned my indebtedness to the writings of Sir William Gull, who, at a time when various cures for rheumatic fever were being boomed in the profession, made (in collaboration with Dr. Sutton) the simple experiment of treating a number of cases with mint-water in order to prove to himself and others what was the course of the disease uninfluenced by other factors than rest in bed and nursing. He thereby demonstrated to the profession that the new remedies were incapable of shortening the disease or of modifying its pathology. That is a simple form of experimental control which might well be applied in other diseases as a preliminary to reports upon the new "specific."

Professor Ryle then selected for particular discussion certain treatments which might be allowed to come within his sphere of criticism either because of the manner in which they had been launched and the credulity with which they had been accepted, or because they had already been employed for a long time without adequate justification or proofs of efficacy, or because he saw a danger of their becoming accepted as general rather than occasional therapeutic measures. In each case, there seemed to him, there had been acceptance without due criticism or proper clinical trial or without a fair determination of scope. In each case the chief criticism of the method was to be found in a simple study of the prognosis of the disease or a fuller understanding of what Sydenham would have called its "natural history." The treatments considered in turn were: (1) A recent treatment of peptic ulcer by the injection of histidine; (2) A recent suggestion that surgical intervention for bleeding peptic ulcers should be extended; (3) The employment of serum in streptococcal septicaemia; (4) The employment of type sera in pneumonia; and (5) The use of certain much "boomed" subcutaneous remedies for pneumonia, influenza, and other febrile diseases. Some of these treatments, it was said, have had their origin in genuine scientific endeavour and in animal experiment, or have derived from wide clinical experience and the growth of technical skill. Others have had no such initiation. In the case of (2) and (4) it was fully appreciated that there are certain circumstances in which the treatments are justified. Professor Ryle was apprehensive only lest their advocacy should be too generally and thoughtlessly or too rapidly approved. After exposing ruthlessly from an analysis of the clinical evidence the fallacies underlying the wide advocacy or use of the above treatments, which nevertheless have had some scientific backing, he then proceeded to deal with some other treatments which are so patently unsupported by reason or inquiry or results that one wonders how they retain their popularity at all.

I have frequently been asked in recent years, said Professor Ryle, when asked to consult over a case of pneumonia, septicaemia, "influenza," bacterial endocarditis, or other obscure continued fever, what my opinion was of substances which I will call X or Y, and which have been advocated by proprietary firms, and, more rarely, by medical men writing to professional journals, as capable of influencing humoral pathologies and expediting cure. Their vogue is now, I fancy, declining. I have usually prophesied it would do so, just as the use of vaccines and the application of ultra-violet rays for every kind of debility have suffered a gradual loss of favour. Why should I have been so sceptical? The reasons are easy to state. First, the treatments were launched without preliminary trials; their boons, just like those of any quack remedy in the advertisemen pages of the Sunday papers, were proclaimed in advance. Secondly, the claims for these substances were not, so far as I could learn, based upon any animal experiment. Thirdly, their pharmacological or biological actions, whether in animals or men, did not appear to be known, if, indeed, they had any such action. Fourthly, although they were clearly being used quite extensively in practice, in the teaching hospitals they had no vogue. Finally, when I examined charts and cases in which these remedies had been used before my advent I could not discover that anything had been achieved by them. Sometimes

their employment had even seemed to stultify inquiry and postpone diagnosis. I remember a laudatory paper in a journal in which a doctor reported upon cases of "influenza" treated with one of these remedies. In the majority of his cases the fever terminated within three days. He quite overlookeed the fact that that was the approximate course of the disease in the particular epidemic.

What are the reasons, apart from the subtle virus of advertisement, which impel doctors to employ such doubtful and unproved remedies? They may do so in an anxious or troublesome case with a forlorn hope that this time "it may do good." They may do so from a vague urge "to do something active" when at the end of their resources, and for some reason a hypodermic injection has come to be regarded as a more positive action than the prescription of a potion or a poultice. They even do so—and this has not infrequently, I believe, been the case with vaccines and with histidine—"because the patients demanded it."

But surely, observed Professor Ryle, these are all motives unworthy of our art. Not only are they unworthy in themselves, but I would suggest, he said, that each time they lead to action they are liable to be accompanied by omission of rational symptomatic measures of importance to the patient. There is no case, however obstinate or grave, in which there is nothing left to be done. Sleep and rest must be secured; anxiety on the part of patient and relatives must be comforted or allayed; nurse and relative must be given instructions and "kept busy" in all such emergencies as haematemesis, streptococcal septicaemia, and pneumonia. For the patient, posture, the administration of morphine or oxygen, the fluid intake and how it should be maintained and by what routes, the blood count or culture, and many intimate details of nursing must all be catered for. Close clinical scrutiny must continue with the mind as far as possible detached from its anxiety. Meanwhile the *vis medicatrix* is being assisted and the doctor is busy enough, without unwarranted or speculative interference, to satisfy patient and relative, who will be the first to appreciate the form and intent of his industry. Referring to the details of symptomatic treatment employed by him in rheumatic fever, Gull remarked that "it required often more consideration than was requisite for prescribing any supposed appropriate drug treatment." The same could be equally well said of careful routine treatment in ulcer cases, gastric haemorrhage, septicaemia, and lobar pneumonia.

Let us now contrast, added Professor Ryle, the study of new remedies which have been unanimously acclaimed. Banting's discovery of insulin was based upon careful experimental methods, its action confirmed in animals with experimental diabetes and then upon patients with the natural disease treated under proper conditions in respect of control and observation. Only then was it presented to the profession. Within a few months its benefits were everywhere apparent. It had "come to stay" in every country in the world. It satisfied alike the credulous and the sceptical.

Minot's demonstration of the value of liver therapy in pernicious anaemia was partly dependent on earlier animal experiments by Whipple with artificial anaemias and then on careful clinical trials checked at every stage. Its refinements have depended equally on close clinical observation and intimate haematological study. As a consequence an intensive study of the blood diseases has followed and the value of massive iron therapy in microcytic anaemia has also been proved. As with insulin, so with these treatments—acceptance was inevitable; the treatments were studied eagerly and employed actively but critically in the teaching hospitals from the first, and rapidly revolutionised practice throughout the world. In each case prognosis was at once and subsequently improved.

The experimental method of originating new therapeutic measures does not preclude the occasional empirical discovery like quinine and digitalis and prostigmin, but even such discoveries require and have received, sooner or later, what may be called "adequate clinical trial" or scientific assay, or both. The Therapeutic Trials Committee of the Medical Research Council does valuable work in arranging for proper trials of any new remedies which the manufacturing chemists are prepared to submit to it, but we are daily confronted with the advertisements of treatments launched as a commercial speculation and with no such scrutiny. I believe, insisted Professor Ryle, that our profession would gain nothing but respect and increased allegiance from the public if it were to insist on more frequent and judicial inquiries into all therapeutic innovations. Only by the study of disease and its natural origins, processes, and progress, he concluded, can we learn how to influence its prognosis for the better, whether by active intervention or refraining therefrom. In the next stage of medical evolution the actions and uses of remedies, in common with other biological phenomena, must be determined not by advertisement or opinion, but by observation and experiment.

It has been stated authoritatively that during the last 25 years Orkney's Clydesdale horses have improved more than any other class of stock in the islands. This improvement is largely due to the former heavy horse breeding grants, discontinued in 1932. When will the powers that be recognise this fact and renew support? The heavy horse breeding grants were a real asset to horse breeders, and the sum involved was comparatively small.—*Scottish Farmer.*

The Veterinary Record

December 12th, 1936.

KING EDWARD VIII

IT is with profound sorrow that, as we go to press, we learn that the crisis centring round the Throne has culminated in the announcement of the intention of His Majesty King Edward VIII to abdicate. We are not concerned here with the personal and constitutional issues involved—indeed, it is doubtful whether at the moment we are in a position to appraise all the circumstances germane to this crisis—but solely to record our abiding regret that it should be the lot of the British Royal House, the people and the Empire, to face a calamity such as rends the heart of a nation, and in which our loved ruler, Patron of this Association and Honorary Associate of the Royal College, is the central suffering figure.

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THE CHAIR OF ANIMAL PATHOLOGY AT CAMBRIDGE

IN his official announcement of the vacancy of the Professorship of Animal Pathology, at Cambridge, the Vice-Chancellor of the University drew particular attention to the following statute: "Under Statute D, XIII, 1 (ii) the Council of the Senate have determined that at this election preference shall be given to a candidate whose experience and interests lie chiefly in scientific investigation rather than in veterinary practice, and that a professional veterinary qualification, though undoubtedly advantageous, shall not be regarded as essential."

We are most sympathetic with the University Authorities in their desire to secure the best man for the post and we agree that one whose experience and interests lie chiefly in scientific investigation is eminently desirable, but we cannot help but feel that the subsequent suggestion that a veterinary qualification is not essential comes at a most unfortunate time in the history and development of research into the diseases of animals. We do not contend that the possession of a veterinary qualification is a guarantee that the holder is qualified to direct the staff of a research institute, but we maintain that the training necessary to become a veterinary surgeon carries with it a more intimate and detailed knowledge of the sciences and practices concerned with animal health and disease and is, therefore, indispensable to the holder of such an appointment as the one under consideration.

During recent years a determined effort has been made to extend the amount of research work into the problems associated with the diseases of animals and many individuals and bodies interested in these problems have been endeavouring to understand the cause for the relative shortage in veterinary investigators. We have pointed out in a recent editorial that one of the greatest deterrents to the adoption of a research career connected with animal pathology is the paucity of senior posts. One of the most important, if not the most important, of these posts is the Professorship of Animal Pathology at Cambridge. To remove this post from the realms of the aspiring veterinary research worker will contract considerably his vision of the future, with the result that recruits will be discouraged still further from embarking upon a career of research.

A second harmful effect that would follow the appointment of a non-veterinarian to the Cambridge Chair would be a general one upon the outlook of the veterinary profession. During the present century this profession has risen to a position of importance in the affairs of the country but during this rise it has been misunderstood by many outside its ranks. In the past this misunderstanding was no doubt strengthened to some extent by a reluctance on the part of the profession to mix and collaborate with other scientific professions, but during recent years this spirit of isolation has given way to an increasing spirit of collaboration which has benefited both our own and other professions. In our view, to appoint a non-veterinarian to the Cambridge Chair will almost inevitably lead to a complete reversal of this outlook both amongst veterinary clinicians and those engaged in research, and the profession will conclude that the policy of co-operation has failed.

On the other hand, we feel that the appointment of a veterinarian with considerable experience in research is likely to extend this collaboration with other sciences and to help increase the advancement of research into animal diseases. We do not doubt that the Electors will find amongst our members individuals with sufficient experience of research to justify the selection of one of them to fill this post. Such an appointment would not only augur well for the future progress of veterinary science but would also, we believe, redound to the credit of the great scientific reputation of the University of Cambridge.

Clinical Communications

POISONING OF CATTLE BY RAGWORT (SENECIO JACOBÆA)

N. BISSET, M.R.C.V.S.
CARDIFF

On October 1st, of this year, the writer was consulted by Captain A. J. S. Reynolds, Veterinary Inspector for Pembrokeshire, regarding mortality among cattle on a farm in the southern part of the county.

Eighteen animals were reported to have died between the beginning of May and the end of September, the symptoms, in order of appearance, being unsteadiness of the hind limbs, diarrhoea, a peculiar "heaving" movement of the abdomen leading to excessively severe straining, occasionally involving eversion of the rectum, and extreme cerebral excitement, amounting to delirium. Death resulted in about four days from the appearance of straining. Captain Reynolds suspected poisoning by ragwort.

A visit was paid to the premises on October 2nd. One animal, an 18-months-old bullock, was dead, and three were showing unsteadiness of the hind quarters, diarrhoea, and slightly jaundiced visible mucous membranes. The temperature was normal and there were no symptoms of straining.

Post-mortem Lesions.—The skin of the whole carcase was abnormally yellow. The rectum was not everted but the anus was surrounded by clotted blood.

The abdominal cavity contained a considerable quantity of blood-tinged fluid. The liver was yellowish-pink in colour, somewhat reduced in size, with rounded edges, and was markedly cirrhotic. The gall-bladder was greatly enlarged and contained fully 38 ounces of dark, viscid bile. Fluid was present in the pericardial sac.

The rumen, reticulum, and omasum were normal, externally and internally, but the abomasum showed small haemorrhages on the peritoneal surface. Petechial haemorrhages were present on the mucous membrane of the abomasal folds which had an oedematous appearance, being approximately three-eighths of an inch in thickness. The apparent thickening was actually due to a sub-mucous gelatinous exudate.

Haemorrhages were present on the peritoneal surface of the small intestine, the mucous membrane of which showed sub-acute inflammation throughout. The latter portion of the large intestine was acutely congested, with haemorrhage in the rectum. The kidneys were pale and somewhat soft. The spleen was normal.

These lesions, particularly those of the liver and abomasum, together with the symptoms described by Captain Reynolds and corroborated by the owner, were strongly suspicious of poisoning by ragwort.

The field in which the affected animals had been pastured since April (with the exception of a month) was then examined. It consisted of very poor land covered chiefly with thistles and rushes. Ragwort was not exceptionally prevalent, although it was extremely plentiful on several other fields.

When these points were put to the owner he mentioned that the pasturage had been supplemented by hay from a certain stack which, on examination, was found to contain a considerable proportion of ragwort, the ends of the stalks of the plants being impressively prominent on the cut surface of the stack. About two-thirds of the latter had been used, but the owner stated that no hay from it had been fed to the animals for about five months. The stack certainly did not appear to have been cut for some time.

The latent period noted in ragwort poisoning was carefully explained, but did not appear to carry more than a polite conviction—a not unusual experience.

Discussion.—The description of the *post-mortem* lesions given in the accounts of most plant intoxications may be summed up in the words "gastro-enteritis" and "haemorrhages." Ragwort poisoning is one of the very few instances (if not the only one) which produces characteristic *post-mortem* appearances, those of the abomasum and liver being, in one's experience, quite typical.

The latent period in the case in question (five months approximately, *if the memory of the owner is accurate*) exceeds that of 96 days quoted as the maximum hitherto observed. The latent period depends probably, to some extent, on the resistance of the animal.

In all cases of ragwort poisoning observed by the writer the plant was fed in hay or eaten when cut and lying on the fields. In this instance a portion of the suspected stack, cut out at random, and weighing 44 pounds, contained nearly four pounds of the dried weed. It was, therefore, possible for a considerable amount of the plant to be ingested in a comparatively short period. Owing to the extreme poverty of the pasture all hay given was eaten with avidity.

On the occasion of a subsequent visit it was reported that one of the affected animals observed on October 2nd had died seven days later, after showing typical symptoms, but had been buried.

Summary.—The evidence in the great majority of cases of plant poisoning is, often necessarily, circumstantial. In this outbreak, the occurrence of deaths at intervals of from one to about five months after ingestion of the ragwort-containing hay; the symptoms of excessive and characteristic straining; and above all, the

typical *post-mortem* lesions, point conclusively to poisoning by ragwort.

While entirely agreeing with Captain Reynolds on this point, the writer is unable to associate himself with the opinion that grass sickness in horses may be traceable to the same source.

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PROTUBERANCE AS SEQUEL TO FRONTAL FRACTURE IN A BOVINE

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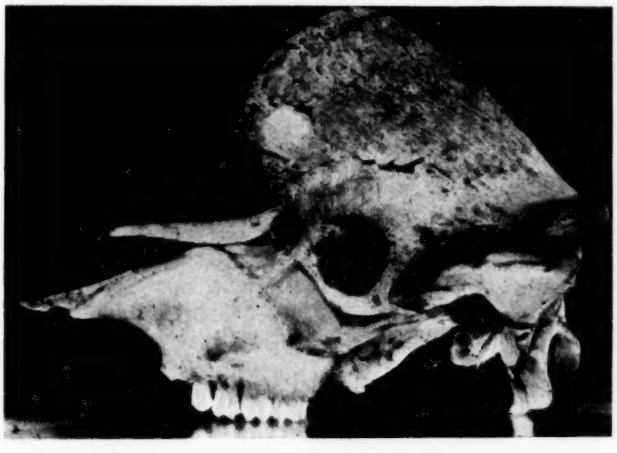
Recently a curious specimen, of which I enclose photograph, was forwarded to the Veterinary Laboratory, Wallaceville from Hokitika, New Zealand, for the laboratory museum.

The subject was a bullock which had jumped a gate and had hurt its head by falling, apparently sustaining a fracture of the frontal bone. Bony enlargement occurred and the growth continued for three-and-a-half years, during which time the animal was in good health and carrying its head at the correct angle. A horny cap which has been mounted on the skull grew over the hollow protuberance. The animal was destroyed for beef and the head preserved for the Wallaceville Museum.



Abnormal Protuberances on the Head of a Pig*

In the abattoir a six-months-old pig was found to have a horn-like protuberance above the right eye, three inches in height and one-and-a-quarter inches in diameter at the base, with two similar smaller structures, about one inch high, just below the eye. These were soft in consistence; the skin covering them was normal, but calloused at the tip, and on incision they were found to contain nothing but quite normal fat. The eye itself was completely occluded, and the eyeball was a pigmented hardened mass.

*Note forwarded by Mr. A. D. M. G. Laing, M.R.C.V.S., Brierley Hill.

Annotation

NON-SPECIFIC PROTEIN THERAPY

It is characteristic of many new therapeutic measures in medicine, especially those resting on an empirical basis, that after a period of excessive popularity they suffer a decline in prestige. Generally, lack of knowledge in the fundamental mechanism of their action together with the claims of over-enthusiastic supporters induce a certain scepticism towards such methods of therapy. It is now over 20 years since the observation was made that typhoid vaccine exerted a favourable influence in the course of typhoid fever in the human subject. This was followed by further observations on the fact that similar results could be got with *Bact. coli* vaccine, with albumose, or with boiled milk, and it may be said that *Non-specific Protein Therapy* dates from these observations.

Although our present knowledge of the mechanisms by which the body overcomes infection is still very imperfect, we know that specificity and specific antibodies are not the sole phenomena concerned. It is now well known that there exist in normal sera certain bactericidal substances which are non-specific in their action and which are not increased as the result of immunisation. In addition, it appears that biochemical and biophysical alterations in the humoral and cellular tissues may also play an important part.

The literature on non-specific protein therapy is an extensive one, and it is proposed to refer only to two informative articles recently published on this subject. The first of these, by Cecil,* gives a critical survey of the whole field of non-specific protein therapy, and reviews the indications for its use in human medicine. In the second paper, Hektoen† deals in more detail with the changes which occur in the body in response to the parenteral introduction of foreign protein.

Proteins Used.—Many forms of protein and protein derivatives have been used therapeutically. Among the more important of these are: Ordinary skimmed milk which is boiled for five to ten minutes, cooled and injected intramuscularly; diphtheria antitoxin which is not given for its antitoxic property, but because it is the most readily available form of horse serum at the disposal of human medicine; and vaccines comprising stock and autogeneous vaccines. Typhoid vaccine is the most popular agent.

*Cecil, R. L. (1935.) Non-Specific Protein Therapy. *J. Amer. med. Ass.* **105**. 1846-1854. (Numerous refs.).

†Hektoen, L. (1935.) The Reactions to the Non-Specific Protein Treatment of Infectious Diseases. *Ibid.* 1765-1767.

In addition to the above, a great many proprietary substitutes are on the market. Cecil thinks it very unlikely that these commercial products possess any virtues not equally inherent in the agents cited above.

The Non-Specific Reaction.—The reaction to foreign protein injections varies from an almost imperceptible one to extreme shock associated with fever and profound vasomotor disturbance. In this connection the effects of intravenous injection on the one hand, and intramuscular or subcutaneous on the other, must be sharply differentiated. Administration by the two last routes excites comparatively mild reactions, and only when very large doses of protein are given is there any elevation in temperature. Intravenous injection, however, evokes more rapid and more marked reactions. At first there is a definite chilliness which is followed in two to three hours by a rise in temperature of 3° to 4° F., and is accompanied by a proportional increase in pulse rate. Defervescence is usually rapid. Following the injection there is an initial leucopenia followed by a gradually increasing polymorphonuclear leucocytosis which reaches its maximum in about six hours.

Focal reactions—*i.e.*, temporary exacerbations of acute symptoms in some remote site of inflammation—may follow intravenous injections. The site of this focal reaction may be any inflammatory lesion irrespective of its etiology, *e.g.*, an old traumatic injury.

Mechanism of the Reaction.—It has been generally assumed that the beneficial effect of foreign protein injection is referable to the fever. Cecil and Hektoen are agreed that this may be so up to a point, but that much further study is needed to give a clearer insight into the intimate changes which occur in the humoral and cellular tissues of the organism in response to foreign protein. At present it is impossible to say which changes are responsible for the beneficial effects. Perhaps the most important function of the foreign protein reaction is the mobilisation of specific immue bodies in the circulating blood. The non-specific proteins—serum, milk, vaccines—used in treatment are in themselves antigenic and may call forth homologous antibodies. These, however, could not be expected to exercise any direct therapeutic effect on the specific infection. It seems possible, nevertheless, that these new antigens, artificially introduced, may have the effect of stimulating increased formation or increased mobilisation of the specific antibodies against the original infection. Whether normal antibodies and other bactericidal substances in the blood are increased in non-specific protein treatment has not been determined.

There are some who believe that the leucocytosis which accompanies the reaction has an important therapeutic value, but whether the leucocytes have a greater phagocytic power (increased opsonic index) than normally does not seem to have been determined.

Finally, it is necessary to note that some workers attach great importance to the liberation of enzymes, particularly proteoses and lipases, into the blood stream following the injection of proteins.

Clinical Application of Protein Therapy.—Cecil believes that non-specific protein therapy will find its greatest usefulness in acute and subacute infections. The glowing reports by some writers on the achievements of protein therapy in various chronic diseases have not been widely corroborated. It is significant, he says, that many of these rather startling claims have been made with regard to certain chronic infections which are characterised by periodic remissions and exacerbations.

The benefit of this form of therapy often seems to be in proportion to the amount of constitutional reaction and fever produced. With respect to subcutaneous and intramuscular injections of vaccines or proteins such as milk, peptone and the like, which produce little or no reaction, Cecil's attitude is non-committal. He says: "As a rule these injections do no harm, but often they fail to do any good."

It would be impossible to enumerate the very varied disease processes for which non-specific protein therapy has been tried, but in human medicine it has met with fairly general acceptance in the following: typhoid, pneumonia, sepsis, syphilis, acute and chronic arthritis, diseases of the skin, and diseases of the eye. In view of their interest to veterinary readers we might refer in a little more detail to the last two conditions. Infections of the skin in which favourable results have been reported are furunculosis, carbuncle and other staphylococcal infections. Less success has been obtained in ringworm, pruritus and the like. The benefits claimed in psoriasis have not been substantiated. No benefit whatever has been obtained in eczema or in allergic dermatitis. With regard to diseases of the eye, reports are rather conflicting. Non-specific protein therapy has been employed extensively in iritis, uveitis, keratitis, conjunctivitis and other inflammatory conditions of the eye, and it would appear that it may constitute a useful adjunct to local treatment.

In conclusion, we would point out that much critical work still requires to be done both on the practical value of the method and on the mechanism underlying its action, before we will be in a position to estimate the real value of non-specific protein therapy, and assign it to its proper place in medical and veterinary treatment. In this field, the laboratory worker is under a disadvantage; while the determination of details may lie within his province, the clinical application must be carried out by the practitioner. The final test rests with him, and

Abstracts

[**Two Cases of Hypertrophy of the Gubernaculum Testis in Inguino-abdominal Cryptorchids.** (Trans. title.) Marcenac. (1936.) *Bull. Acad. vét. France.* **9.** 2. 115-118. 1 fig.]

The author describes two cases of cryptorchidism in horses exhibiting intra-abdominal adhesion of the testes associated with extreme hypertrophy of the gubernaculum testis. The operation of removal was by the inguinal route but it was necessary first to effect division of the mass and then to break down the adhesions by manipulation through a special opening made in the abdominal muscle. In an attempt to explain the abnormality the author suggests that the adhesions existing resulted in additional resistance to the action of the gubernaculum testis and this in turn brought about the hypertrophy of its muscular tissue.

C. D.

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[**The Diagnosis of Pregnancy in the Dog.** (Trans. title.) Lesbouyries and Berthelon. (1936.) *Bull. Acad. vét. France.* **9.** 1. 62-64.]

The authors describe the growth of the foetus in the uterus, and state that in suitable bitches it is possible to feel the foetuses after the 15th day of pregnancy. Methods of palpation are mentioned.

In order to confirm pregnancy when it is impossible to palpate the uterus, the authors examined the urine of bitches known to be pregnant, for the presence of anterior pituitary and ovarian follicular hormones. The former was not found, but the presence of the latter hormone in the urine after 15 to 18 days of pregnancy was demonstrated by the occurrence of oestrus following injection of the urine into castrated female rats.

B. B.-J.

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[**The Results of Treatment of Dog Distemper by the Inoculation of Specific Homologous Serum.** (Trans. title.) Goret, P. (1936.) *Bull. Acad. vét. France.* **9.** 4. 218-225.]

The result of the treatment of 27 cases of distemper by the inoculation of specific serum is recorded. Out of 27, 19 were completely cured, two which received the inoculation some time after the onset of symptoms were helped considerably, and six died.

The author found that serum given at the onset of symptoms gave immediate relief, although it was sometimes necessary to repeat the dose on consecutive days.

When the disease was accompanied by complications it was found to be a very useful adjuvant to other remedies.

He recommends an initial dose of 20 c.c. which can be followed by the same dose at eight or fifteen days interval.

B. B.-J.

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[**The Immunisation of the Dog against Distemper by the Virus-Serum Method.** (Trans. title.) Goret, P., Vuillaume, P., Lelandais, E., and Rousseau, R. (1936.) *Bull. Acad. vét. France.* **9.** 7. 410-414.]

The authors record the results of their immunisation experiments. During the first six months of the year eleven dogs were inoculated and each one received dried virus 24 hours before the dose of hyperimmune serum. The inoculations were carried out on puppies of various breeds at three to four months of age. There were no bad results following the inoculations and up to the time of writing no breakdown in immunity.

Controlled laboratory experients confirmed the practical findings. Four young dogs were injected, two being used as controls. Two dogs were immunised by the virus-serum method and 14 days later all four dogs were given ferret spleen virus. Both the controls died, one in four and the other in eight days, of typical distemper, and one-hundredth of a milligramme of their spleen injected into a ferret killed it in 14 days. The two vaccinated dogs showed no reaction whatsoever.

B. B.-J.

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[**Thymus and Adrenals in the Response of the Organism to Injuries and Intoxications.** Selyl, H. (1936.) *Brit. J. Exp. Path.* **17.** 234-248.]

This paper records the results of experiments carried out on rats, showing the reactions of the body to injuries, with special reference to malnutrition and intoxication by the administration of drugs. The reactions were studied by noting changes in the thymus and adrenals.

Fasting alone seemed to cause little variation in the size of the thymus for 48 hours, but at the end of four days there was marked involution. The effects of the drugs injected were then noted and taken as any variation in the size of the thymus in rats starved up to 48 hours. It was observed that certain drugs caused involution of the thymus much more rapidly in rats at five months of age than in those of only two months.

It was found that atropine, morphine and formaldehyde produced rapid involution of the thymus within 48 hours. This change was accompanied by a proportional increase in the size of the adrenals. When the latter were removed surgically, however, it was found that these drugs produced no change in the thymus.

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the practising veterinarian, who has perhaps greater opportunities than his medical brother, can contribute valuable assistance by the careful recording and publication of his findings.

N. J. S.

Further experiments were carried out to ascertain which adrenal hormone acted on the thymus in this matter and it was found that complete removal of the medulla produced no change in the thymus when the drugs were administered.

Sodium chloride restored the otherwise low resistance of adrenalectomised animals to the action of drugs, but only in those animals which had been fed.

The experiments seem to show that involution of the thymus with compensatory enlargement of the adrenals represents an "alarm reaction" of the body to external injury.

B. B.-J.

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[The Effects of Some Natural Factors on the Second Ecdysis of Nematode Infective Larvae. Lapage, G. (1934-35.) Rept. Inst. Anim. Path. Camb. 4. 280-304.]

Continuing his observations on the factors which influence the second ecdysis of infective trichostrongylid larvae, Lapage indicates that the *p*H of their environment and the age of the larvae are interlinked. Acids cannot alone cause ecdysis but they may alter the permeability of the sheath in such a way that the osmotic process previously described by the author can bring about ecdysis. Also, comparatively great and sudden temperature changes cannot alone cause ecdysis but they influence it indirectly by their effects on the activity of the larvae and on the acid-base equilibrium of the environment. A minimum of alkali seems necessary for exsheathment and the older the larvae the less alkali is required. There is no evidence that friction and damage are essential for ecdysis, even in older larvae whose sheaths normally become brittle, or that the so-called boring movements of non-skin-penetrating larvae play an important part in the production of exsheathment.

J. N. O.

(Contributed by the Imperial Bureau of Agricultural Parasitology.)

Supernumerary Kidney in a Pig*

During the course of meat inspection a large sow was discovered to possess three kidneys. The extra kidney was situated on the right side, at the pelvic brim, and on being incised was found to have a pelvis and ureter connecting with that of another kidney in the normal position on the same side. These two kidneys were about half the size of the kidneys usually found in sows of such weight. The kidney on the left side of the carcase appeared to be quite normal. The animal was in very fat condition.

*Note forwarded by Mr. A. D. M. G. Laing, M.R.C.V.S., Brierley Hill.

Reports

NEW ZEALAND

DEPARTMENT OF AGRICULTURE: LIVESTOCK DIVISION, 1935-36

The Dominion is particularly free from contagious diseases of horses, but the position is not so satisfactory as regards cattle diseases. The list of those reported, and dealt with, is a somewhat lengthy one, but not all are of importance. Of the cattle inspected, after slaughter, for consumption, 6·52 per cent. were affected with tuberculosis, the total number of condemned carcases being 6,527. An increase of Johne's disease is reported and it is thought that it may exist upon farms the owners of which have not reported it. The incidence of mammitis has not increased and there is evidence of better hygienic methods in milking sheds. More owners are taking advantage of, and benefiting from, the mammitis control scheme. Contagious abortion remains somewhat as in previous years.

The principal loss in sheep is from internal parasites, whilst pulpy kidney disease in lambs has increased in one district. Lymphadenitis is of economic importance and practical measures for its control are being actively prosecuted. The pig industry is advancing and is now a valuable adjunct to dairying. Over 1,000,000 pigs were slaughtered for consumption and 16·78 per cent. were condemned for tuberculosis. Many other rejections were on account of defects which could be obviated by better management. Pasteurellosis and suipestifer infection, necrotic ulceration of the skin, and malnutrition, are all a source of economic loss. There is ample evidence that the problems of all stock diseases are being treated in an energetic manner.

It is impossible briefly to review the mass of detail in connection with work carried out in the laboratories. Practically every disease is under review with a view to assistance being given to the field workers. In addition, the preparation of vaccines, examination of milk samples, nutritional and biochemical investigations are undertaken.

The department is responsible for instructional work in poultry husbandry, wool production, noxious weeds, and the rabbit nuisance. It is quite impossible, in a short review, adequately to convey a correct impression of the useful and wide-reaching work of the veterinary staff in the Dominion. It is hoped, however, that sufficient has been written to indicate the value of the efforts being made and the success which is attending them.

J. S.

KENYA COLONY AND PROTECTORATE

DEPARTMENT OF AGRICULTURE, 1935

This review deals only with Volume I of this report. The other volumes are not yet to hand. The report for 1934 comprised three volumes.

This volume gives a general review of the state of agriculture for the year, from which it is apparent that the Colony's chief industry (agriculture) is at last recovering from the financial slump of recent years. As an indication of this, the agricultural exports for 1935 realised £2,510,215, or £913,510 over those of 1934, which is the highest export figure since 1930. This revival has not had its repercussions on the welfare of the veterinary services, however, since these were further drastically reduced by retrenchments in staff during the year.

The bulk of the report is devoted to the activities of the Plant Industry Division, but it contains a condensed report by the Deputy Director of Animal Industry (Mr. Daubney). The report of the Chief Research Officer is stated to be included in another volume.

Amongst items of interest in Mr. Daubney's report are the following: There has been a considerable improvement during the year in the prospects of the mixed farmer. Two Committees of Enquiry have been set up, one on the dairy industry and the other on meat and livestock, the latter with the purpose of organising a meat export trade and ensuring improvement in the standard of the livestock. With the exception of a reduction in the incidence of rinderpest the previous unsatisfactory state of prevalence of infectious animal diseases continued, but the hope is expressed that with the improvement in the economic situation in the Colony farmers will soon be able to adopt, in a firmer manner, the recognised methods of disease control. The distribution and measures of controlling the major diseases are given in some detail, but there is nothing of unusual importance recorded in connection with these. There is, however, evidence of renewed activity in certain directions which should alleviate the existing unsatisfactory state of disease incidence. Though the veterinary staff is now small and inadequate to deal effectively with the multitude of problems facing it, it seems to be coping with the situation as well as is possible under such circumstances.

W. K.

The Isle of Man Board of Agriculture has sent out a circular letter to farmers inviting them to co-operate in the use of poison gas for exterminating rabbits, which are causing much damage on the island.

BELFAST

REPORT OF THE CITY VETERINARIAN FOR THE YEAR 1935

From this report of the activities of the Belfast Veterinary Department for 1935 it appears that just over 170,000 animals were slaughtered in the Belfast abattoir during the year. This is an increase of about 1,500 animals over the previous year. The total is made up of 43,464 cattle, 109,948 sheep and lambs, 1,121 goats, 13,488 pigs. The figures for cattle, sheep and goats all show a decrease from 1934, whilst the number of pigs slaughtered showed an increase of over 3,000.

The percentage of animals condemned at the abattoir, from all causes, was 0·58 per cent., again a slight increase over the previous year. A table is given showing in detail the diseases responsible for the seizure of carcases of all animals, but the offal table merely records the total number of organs condemned—the diseases are not mentioned. It is assumed that "mesenteries" refers to intestines also, and it is surprising that no intestines appear on the list as having been condemned in the case of pork pigs. Of swine fever cases, 24 carcases were condemned, and only one carcase for swine erysipelas. It is interesting to note that leukaemia accounted for the seizure of one cow and one pig carcase.

Tuberculosis in cattle is a most fruitful source of total seizure, amounting to 63 per cent. of condemned carcases, and representing a loss to the meat trade of £50 per week.

Table V shows the percentage by age of the condemned animals. Most cattle condemned appear to have been in "fair" condition, and pigs "good." The majority of the 7,899 livers seized are said to be due to "distomes" (fascioliasis).

Meat and meat products prepared outside the city boundary were also inspected, as were the butchers' shops, pork stores and cold stores.

In addition to these activities in meat inspection the department is responsible for the inspection of 64 cowsheds and 1,000 milch cows in the city area. During the year 358 inspections were carried out, nine cases of tuberculosis reported, and several cases of non-tuberculous mastitis dealt with. Further duties include the supervision of the herd of cows at the Balmoral Boys' School, City Tramways animals, Fever Hospital, Sanatorium, and Parks Committee animals.

There are no private slaughterhouses in the city, and all animals slaughtered are first effectively stunned. Live animals cannot see their fellows slaughtered.

Mr. McLean concludes his informative report with a tribute to all who have assisted him

during the year, and it is interesting to note that not only is he kept hard at work with his veterinary duties, but he is also saddled with the work of abattoir manager. The whole report is a testimony to the strenuous nature of a whole-time officer's duties in a municipal post of this kind.

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DUMFRIES

REPORT OF THE COUNTY VETERINARY OFFICER, FOR THE YEAR 1935

The report refers to the work done under the Milk and Dairies Acts and relative Orders and the Scottish Meat Regulations, 1932, and was carried out by the Chief Veterinary Inspector, Mr. Sangster, and one assistant.

Milk and Dairies Acts.—During the year 28 new dairy premises were registered and the total number of dairy cows increased by 792, making a total of 1,091 registered premises and 18,670 cows. There are 178 self-contained herds and this system of dairying is stated to be steadily increasing.

Visits of inspection to the number of 1,098 were made to dairy premises and an additional 201 visits for advisory purposes in connection with building construction and alterations. The number of cases of mastitis found at clinical examination was 331, a decrease of 108 on the previous year.

Milk (Special Designations) Order (Scotland), 1930.—

	No. of producers.	Av. No. of animals.	Estimated production.
Certified	1	35	31,500 Gals.
Grade A (T.T.) ...	33	1,406	973,520 „
Grade A	2	48	20,665 „
Non-Graded Tubercle-free ...	6	203	121,170 „

In addition, during the year 60 farmers were having their herds tested with tuberculin. Two Grade A (T.T.) herds are also "attested" while 18 others are eligible for application. One hundred and seventy-one out of 243 samples of non-graded milk examined biologically were of Grade A (T.T.) standard. This is very satisfactory, particularly since most of these samples were taken during the summer months. Tuberculin testing of graded herds is carried out by the veterinary staff and the number of animals tested during the year shows an increase of 1,370 over the previous year. Twenty herds showed no reactors; six herds, one reactor in each; three herds, two reactors in each; three herds, three reactors in each, one herd had five reactors and one had nine. It should be stated that the reactors in the last two herds mentioned were found at the first official test.

Tuberculosis and Tuberculosis Order, 1925.—Five hundred and eighty-six animals were reported and examined and 166 of these were dealt with under the Order. Sixty-five showed "advanced" tuberculosis while 101 were "not advanced." Ninety-six of the animals slaughtered under the Order were reported by the veterinary officers themselves.

Two hundred and thirty samples of milk were examined microscopically and 68 biologically for evidence of tubercle bacilli. Of the former seven and of the latter one were found to be positive.

Sixty-five of the 68 samples of milk examined biologically consisted of grouped bulk milk from 154 farms.

Of 287 samples examined for pathogenic organisms other than tubercle bacilli, 73 were positive and were mostly from cases of mastitis. Two hundred and six samples of sputum were examined and 34 were found to contain tubercle bacilli.

No report was received that milk consigned to the area of another local authority contained tubercle bacilli.

Meat Inspection.—The last part of the report deals with the work done in three public and seven private abattoirs. Seven hundred and four visits were made for this purpose and an additional 26 visits to unlicensed premises for the inspection of animals slaughtered in emergency. One hundred and eighty-one carcases of food animals comprising 58 bovines (excluding calves), 21 sheep, 41 calves and 61 pigs were seized. The number of calves seized is stated to be lower than in the previous year but the number of pigs is higher, although the percentage of pigs showing lesions of tuberculosis is half that of the previous year.

The increase in the number seized is due to the fact that a greater number were slaughtered during the year.

The total weight of carcases seized was 69,497 pounds and of offal 39,493 pounds, but no mention is made in the tables of the numbers of animals slaughtered or the conditions which warranted seizure.

RESEARCH IN CHEMOTHERAPY

The Chancellor of the Exchequer has announced that in response to a request from the Medical Research Council and the Department of Industrial and Scientific Research, the Government has agreed to give a grant of £30,000 a year towards the establishment of an institute of chemotherapy.—*Pharm. Jour.*

N.V.M.A. Divisional Report

NORTH OF IRELAND V.M.A.*

MEETING AT QUEEN'S UNIVERSITY, BELFAST

A meeting of the above Association was held in the Agricultural Building, Queen's University, on November 6th, 1936, at 7 p.m. The President, Mr. Gilmore, occupied the chair.

The following members were present: Messrs. Barclay, Campbell, Cassells, Crawford, Duncan, Dunlop, Finch, Foggie, Gilmore, Gordon, Harper, Henry, Hobson, Inglis, Jones, Ewing Johnston, Kellett, Kelly, Kerr, H. G. Lamont, Magowan, McAllan, McConnell, McLean, Monro, Morrow, Robinson, Rosborough, Russell, Shanks, Sim, Stewart, Stratford, Tweed and Wallace, together with the following visitors: Messrs. Thompson, Walsh and Whyte.

The minutes of the previous meeting were read and adopted.

A message of apology from Mr. W. S. Lamont for inability to attend was read by the Secretary.

The President then extended the congratulations of members to Mr. Ewing Johnston on his being elected a Vice-President of the N.V.M.A., and pointed out that the honour, besides being a personal one, was also one for the North of Ireland Division itself. Mr. Ewing Johnston, in thanking the members for their congratulations, said he deeply appreciated the honour which had been conferred upon him, but was still at a loss to understand why he should have been chosen for this particular distinction.

Obituary.—The President then asked the members to stand in silence to show their respect to three members of the veterinary profession, Messrs. McCrea, Crichton and Gilmore, who had passed away since the last meeting of the Division. The President made special reference to the death of Mr. McCrea, who was the immediate Past-President and who did so much for the veterinary practitioners in Northern Ireland during his period of office.

Address.—The Chairman then called on Professor R. G. Linton, Professor of Veterinary Hygiene and Dietetics at the Royal (Dick) Veterinary College, Edinburgh, to give his informal talk on "Farm Buildings, with special reference to Byres and Piggeries."

Professor Linton discussed very comprehensively in the time available all the aspects in the construction of byres and their hygiene. The talk was amplified by lantern slides to illustrate the various points under discussion. The members were greatly impressed by the open-mindedness of the speaker and the interesting manner in which he discussed his subject.

*Received for publication November 11th, 1936.

Time did not permit Professor Linton to deal with piggeries. The interest in the talk was reflected in the very interesting discussion which followed and in which the following members took part: Messrs. Kelly, Ewing Johnston, McAllan, McLean, Lamont, Magowan, Hobson, Jones, Finch and Kerr. Professor Linton replied suitably to the numerous questions raised by the various speakers.

On the proposition of Mr. McAllan, seconded by Mr. Ewing Johnston, Professor Linton was warmly thanked for providing the Division with such a successful meeting.

Other Business.—Messrs. Ferguson (Newtownards) and Allan (Ministry of Agriculture), having been duly proposed and seconded, were formally elected members of the Division.

The meeting ended with the passing of votes of thanks to Mr. Kerr for operating the lantern and to the authorities of Queen's University for the use of the lecture room for the meeting.

P. L. Shanks, *Hon. Secretary.*

EXAMINERS IN VETERINARY SCIENCE FOR THE UNIVERSITY OF LONDON

At a meeting of the Senate held on November 18th, it was resolved that the following be the constitution of the Boards of Examiners for the Second, Part II, and Final Examinations in Veterinary Science for Internal and External Students in 1937:—

Veterinary Anatomy.—E. C. Amoroso (R. Vet. Coll.); J. McCunn (*Chairman*) (Lecturer at R. Vet. Coll.); and the External Staff Examiner.

Veterinary Physiology.—J. Y. Bogue, W. L. Symes (*Chairman*) (R. Vet. Coll.); and the External Staff Examiner.

Veterinary Hygiene.—W. C. Miller, G. H. Wooldridge (*Chairman*) (R. Vet. Coll.); and the External Staff Examiner.

Veterinary Pathology.—F. C. Minett (*Chairman*) (R. Vet. Coll.); and the External Staff Examiner.

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HUSKLESS OATS

Nature (October 3rd) refers to the considerable public interest which has been aroused during the past two years in a variety of huskless oats introduced by Mr. William Parker, of Babingley Hall, near King's Lynn. "In 1936, with the agreement of the introducer, the National Institute of Agricultural Botany carried out accurate yield trials of this variety in Cambridgeshire, Somerset, Shropshire, Hampshire, Norfolk and Yorkshire. The rate of seeding (45 lb. per acre) and the sowing times (end of March and beginning of April) were those recommended by the introducer. The variety with which the oat was compared was Victory, and at each centre both were sown on the same day. Victory, however, was sown at the normal seed rate for that variety —three to four bushels per acre. On the basis of grain as threshed, Victory outyielded Parker's huskless oat by 97 per cent., but to obtain a true comparison 28 per cent. must be deducted from the grain weights of Victory, this being the normal husk percentage of that variety. On this basis, at only one centre—Cambridge—did Parker's huskless oat outyield Victory, and then by the insignificant amount of 2 per cent.

In Parliament

Livestock Industry Bill

In the House of Commons on December 4th, Mr. W. S. Morrison presented the Livestock Industry Bill "to make provision for the development and better organisation of the livestock industry and industries connected therewith; for paying a subsidy to producers of fat cattle; for regulating the importation of livestock and meat, the holding of livestock markets and the slaughtering of livestock; and for purposes connected with the matters aforesaid." The Bill, which was supported by Mr. Elliot, the Chancellor of the Exchequer, Mr. Ramsbotham, Dr. Burgin, and Mr. Lloyd, was ordered to be read a second time upon Monday next, and to be printed.

[The text of the Bill, was issued on Monday last, and in the course of an attached explanatory memorandum it is stated that Part I of the Bill provides for the constitution of a Livestock Commission to keep generally under review matters relating to the livestock industry, to advise and assist Ministers in such matters, and to undertake the particular functions proposed to be entrusted to them by the Bill. It is proposed that the Commission should consist of a chairman and not more than eight other members appointed by the Minister of Agriculture and Fisheries and the Secretaries of State concerned with agriculture in Scotland and Northern Ireland respectively, and that they should, *inter alia*, take over the functions of the existing Cattle Committee set up under the Cattle Industry (Emergency Provisions) Act, 1934. Provision is made for the constitution of a Livestock Advisory Committee consisting of representatives of producers, local authorities, auctioneers, and other interests, for the purpose of advising and assisting the Commission in the discharge of their functions. Matters concerning England and Wales only or Scotland only will be considered by separate sub-committees of the Advisory Committee.

Part II relates to payments to producers of fat cattle and Part III to the regulation of imports of livestock or meat, while Part IV contains provisions designed to improve the system of livestock markets in Great Britain.

Centralised Slaughter

Part V enables the Livestock Commission, after consulting the Livestock Advisory Committee, local authorities, and other bodies representative of local interests to submit schemes to the Ministers, in connection with arrangements for the erection or alteration, and the equipment and management, of not more than three experimental central slaughterhouses in Great Britain. The schemes may provide for the exercise by the Commission of control over other slaughtering facilities in the experimental areas. Provision is made for Exchequer assistance by grant or by loan, up to £250,000 in all, of which not more than £150,000 may be by way of grant, towards the cost of carrying out such experiments. Provision is also made for the payment of compensation by the Commission to interests affected by the scheme, and for the collection of contributions from the person carrying on the central slaughterhouse and from other interests concerned.

Part VI enables the Livestock Commission to make and submit schemes, at the request of any substantially representative body in the industry, for the performance of such services as the encouragement of research and education and of co-operation in matters affecting the livestock industry and the insurance of livestock and the advertising of meat.

Part VII provides for the establishment on a permanent basis of the Cattle Fund established under the Cattle Industry (Emergency Provisions) Act, 1934, and for the payment into the fund, out of moneys provided by Parliament, of sums not exceeding £5,000,000 in any one financial year.]

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Medical Officers in Private Practice

In the House of Lords, on Tuesday last, Lord Merthyr asked the Government how many county councils in England and Wales had failed to formulate arrangements for securing that medical officers of health should not engage in private practice as medical practitioners, in accordance with the provisions of section 58 of the Local Government Act, 1929, and of section 111 of the Local Government Act, 1933; and what steps were proposed to be taken for ensuring the observance of the law by such councils. The noble lord also moved for papers.

Viscount Gage, Lord-in-Waiting, said that 27 county councils in England and Wales had so far failed to complete the formulation of schemes, but it would be a mistake to deduce from those figures that there had been a serious breakdown of the administrative machinery. The principal cause of the delay was that certain counties had not completed the review of the county areas that were initiated in 1929. Relations between the Ministry and the local authorities had got to be maintained with discretion.

The Minister of Health fully appreciated the importance of compliance with the requirements of the section of the Act as early as possible, and as soon as the reviews had been completed he would draw the attention of the county councils to their statutory obligation. Despite appearances to the contrary, the Minister of Health was satisfied that the majority of the 27 county councils which had not yet formulated their schemes were taking steps to do so, and in the case of only three councils did it appear that failure had arisen. He would use his powers in regard to those councils which continued in an attitude of non-compliance. The programme might be rather slow, but it was going steadily on. It never was contemplated that the reform should be carried out in a short time provided that progress was steady.

The motion was, by leave, withdrawn.

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The following questions and answers have been recorded in the House of Commons recently:—

Grass Sickness in Horses

Sir Malcolm Barclay-Harvey asked the Secretary of State for Scotland what steps he was taking to encourage and co-ordinate research into grass sickness in horses; and what steps the Department of Agriculture for Scotland were taking to deal with this question?

Mr. Elliot: The Animal Diseases Research Association in consultation with the Scottish Board of Veterinary Research has conducted prolonged and difficult investigations into this obscure and serious disease. At the request of the Department of Agriculture for Scotland the Agricultural Research Council recently reviewed the Association's programmes of work and thereafter stated their view that these had been

wisely planned and ably pursued, and that the failure so far to discover a cure has been due not to lack of efforts or of research workers, but to the inherent difficulties of the problem. Proposals with estimates of cost for extended investigation have been submitted by the Association and are at present being considered by the Department and the Council. I would assure my hon. Friend that no effort will be spared to discover the cause of the disease and the means of its prevention or cure.

Mr. Henderson Stewart: Is my right hon. Friend aware whether this Association is amply equipped with funds and staff to do this job properly?

Mr. Elliot: That was the opinion of the Agricultural Research Council.

Mr. Henderson Stewart: Is my right hon. Friend aware that that is not an opinion shared by any responsible agriculturists?

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Racecourse Betting Control Board

Mr. Anstruther-Gray asked the Home Secretary the amount that the Racecourse Betting Control Board will devote to worthy objects during the next year?

Mr. Lloyd: My right hon. Friend is informed by the Racecourse Betting Control Board that they anticipate that a sum of about £120,000 will be available for distribution next year for purposes conducive to the improvement of breeds of horses or the sport of horse racing, or the advancement and encouragement of veterinary science and education.

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Typhoid Fever, Bournemouth

Mr. Groves asked the Minister of Health whether the medical representative of the Ministry who has been inquiring into the Bournemouth typhoid fever outbreak has furnished him with definite proof that a certain milk supply was the cause of the outbreak; and, if so, will he state the nature of that proof?

Sir K. Wood: The report submitted to me on this outbreak showed that all the primary cases of enteric fever which occurred during the outbreak had consumed milk from the same source of supply, and that after this supply was pasteurised no further primary cases had occurred.

. . . . . .

Milk-in-Schools Scheme

Lieut.-Colonel Moore asked the Secretary of State for Scotland whether his attention has been called to the fact that the various educational authorities in Scotland interpret in different ways the regulations with regard to the milk-in-schools scheme, and that, in consequence, in some areas children are receiving far more free milk than in others; and whether he proposes to take any steps to remedy this matter so as to increase further the consumption of milk by children in Scotland?

Mr. Elliot: My attention has been called to a statement to the effect indicated in the first part of the question. The application of the statutory provisions governing the supply of food (including milk) for school children is, as my hon. and gallant Friend knows, a matter under the local authorities. The whole question of milk supply is being considered in connection with the recently published report of the Re-organisation Commission.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Dec. 18th.—Meeting of the South Wales Division, N.V.M.A., at Swansea, 3 p.m.

Dec. 21st.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

1937

Jan. 4th.—N.V.M.A. Committee Meetings.

Jan. 5th.—N.V.M.A. Council and Committee Meetings.

Jan. 8th.—R.C.V.S. Council Meetings.

Feb. 26th.—Annual Dinner and Dance of the Yorkshire Division, N.V.M.A., at Leeds.

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ROYAL VETERINARY COLLEGE

Elections to Executive Council by the Court of Governors

The first meeting of the Court of Governors of the Royal Veterinary College, London, to be held under the new Charter took place in the Council Chamber of the Royal Agricultural Society at 16, Bedford Square, W.C. Of the 18 Governors present in Court, 12 were members of the veterinary profession. Sir Merrik Burrell was appointed Chairman of this meeting, and he will remain Chairman of the Court of Governors until the election of the President and Vice-Presidents at the Annual General Meeting of the Court to be held in January, 1937.

In accordance with the terms of the new Charter, the Court proceeded to the election of ten representatives on the Executive Council of the Royal Veterinary College. The following were elected: Sir Merrik Burrell, Professor J. B. Buxton, Mr. H. W. Dawes, Sir J. Gilmour, Sir Edward Holland, Sir John M'Fadyean, Mr. J. W. McIntosh, Professor E. Mellanby, Mr. E. T. Nethercoat and Sir Archibald Weigall.

It will be appropriate to mention here that other representatives on the Executive Council have been appointed as follows: By the Ministry of Agriculture and Fisheries, Mr. H. E. Dale; Ministry of Health, Dr. J. Hamill; Colonial Office, Captain John Smith; the Royal Society, Professor D. M. S. Watson; Royal College of Veterinary Surgeons, Major G. W. Dunkin and Mr. G. P. Male, together with the Principal of the Royal Veterinary College, Sir Frederick Hobday. The following bodies have

yet to appoint representatives: The Privy Council (one), the Senate of the University of London (one) and the Academic Board of the Royal Veterinary College (three).

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PERSONAL

On Leave.—Messrs. R. F. Gambles, M.R.C.V.S., and W. F. Poulton, O.B.E., M.R.C.V.S., have arrived in this country on leave from Cyprus and Uganda, respectively.

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QUACK VETERINARY MEDICINES

Quackery in veterinary medicines was referred to when the Select Committee on Medicine Stamp Duty resumed its sittings at the House of Commons on Tuesday.

Mr. G. A. Mallinson, Secretary of the National Pharmaceutical Union, said that they had reason to know that there was just as much quackery in veterinary medicines as in patent medicines for human consumption, if not more. The farmers were imposed upon with these patent medicines even to a greater extent than the public.

Veterinary medicines had always been exempted from duty, and apart from objections which might be raised by the manufacturers, there appeared to be no logical reason why secret or proprietary medicines of the kind should be exempt.

Replying to Sir Reginald Blair, Mr. Mallinson said that veterinary surgeons very rarely went to a chemist to have their prescriptions made up; they usually supplied their own medicines, while many of them got the rough drugs at the chemists. "I do not want you to think we have butted in on the veterinary medicine trade," he added. "We do a veterinary medicine trade ourselves, but it has always seemed to us remarkable that you tax human medicines and not veterinary medicines."

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FOOT-AND-MOUTH DISEASE

Another case of foot-and-mouth disease in Derbyshire—at Broadholme, Belper—was reported on Tuesday. An order has been made by the Ministry of Agriculture, taking immediate effect, extending the existing infected area in Cheshire and Derbyshire. The added area lies wholly in the county of Derby, and extends about five miles south of Belper.

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VICTORIA VETERINARY BENEVOLENT FUND

Christmas Appeal

The Secretary of the Victoria Veterinary Benevolent Fund gratefully acknowledges the receipt of £31 in response to his appeal for donations for Christmas Gifts. He would remind readers of the *Veterinary Record* that this special fund is still open.

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DEATH OF A VETERAN WAR HORSE

The Hull Correspondent of the *Times* reports that a veteran War horse, Captain Adrian Bethell's old charger Suzette, has died at Rise Park, Captain Bethell's seat near Beverley, at the age of 32.

Suzette joined the 2nd Life Guards in 1911, and took part in all ceremonial parades in London until 1914, when she went out to Belgium in August with Captain Bethell in the Household Cavalry composite regiment. She took part in the Battles of Mons and Le Cateau, the Retreat from Mons, the Battle of the Aisne, the first and second Battles of Ypres, and the Somme. She was slightly wounded on the Aisne. She served four years in Belgium and France and finished up at Mons on the day of the Armistice in 1918.

Suzette then returned to Rise Park and bred five foals, which have all proved to be good hunters, and hunted with the Holderness Hounds. She took part in the rally of the Old Contemptibles at Sheffield last September, when she led the Hull branch through the city.

Suzette has been buried in the grounds of Rise Park.

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NATIONAL HORSE ASSOCIATION

At a Council meeting of the above Association held on December 4th, 24 new members were elected.

The Publicity Committee reported having approved the main outlines of a quarterly circular to be prepared for the information of members. The Committee had also dealt with questions relating to the 1937 edition of the Horse Owners' Reference Book which is now under preparation with a view to publication as early in the New Year as possible.

The Riding Committee reported having dealt with various questions relating to bridle paths and that it was proposed to convene a special meeting to effect revisions in the conditions governing the Association's scheme for the approval of riding schools and stables. Approval had been extended to some 91 schools and stables and other applications were under consideration. In this connection, it had been agreed that the question of the ownership of the Association's approved riding school signs should be made clear in the new conditions in view of the failure of some proprietors to return these when disposing of their schools. Additional information for filing had been obtained from chambers of commerce and local councils in various parts of the country as to firms in a position to supply the needs of horse riders in respect of accommodation for horses and/or riders, riding clothes, saddlery, forage, &c. In response to an application from the Town Clerk to the City Council of the Corporation of London, arrangements had been made for representatives of the Association to discuss with the Conservators of Epping Forest questions relating to riding in the forest.

The General Purposes Committee reported the receipt of a communication from the Import Duties Advisory Committee intimating that they could not see their way to take action at the present time as to imposing a duty on imported horses although the matter would be kept under review. The Committee also received formal intimation from the Railway Clearing House of the new rates recently announced by the Association for the carriage of grooms in horse box compartments and the type of accommodation, sometimes dangerous, provided in these. The Committee had also considered the position of riding school proprietors in respect of claims arising from accidents, &c., and had agreed that the best course was to effect insurance against such claims. In response to a letter from the Ministry of Transport, the Committee

agreed to recommend the re-election of Mr. Cecil G. Argles to the Transport Advisory Council. A suggestion having been received that the Association should set up an inventions bureau in order to examine new methods and ideas calculated to improve horse transport, it was agreed that the Association is anxious at all times to receive particulars of worth-while inventions. The Committee had also considered a complaint that the portion of Blackheath set apart by the London County Council for horse riding is not easy of access and had agreed to measures to be taken to bring the views of riders to the L.C.C.

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ANIMAL LOSSES IN CHINA: A PREVENTIVE PLAN

The *Inspection and Commerce Journal*, issued by the Ministry of Industry, National Government of the Republic of China, quotes Dr. E. A. Rodier, a veterinarian of international repute and an animal husbandry expert who has for the past three years officiated as technical adviser to the Kwangsi provincial government, as stating, in the course of an interview with the Central News Agency, that monetary loss incurred from the death of animals by preventable diseases in China annually is conservatively estimated at $100,000,000. In Mongolia alone, where animal raising is the main occupation, 1,000,000 animals are reported to have died of such diseases last year, inflicting an economic damage of $50,000,000 to the Mongols.

"A recent arrival from Nanning, capital of Kwangsi, where he has been directing the admirable work done by the Bureau of Animal Husbandry during the last three years, Dr. Rodier sees in this country an immediate need for the creation of a National Bureau of Animal Industry in order to work for the benefit of China's enormous farming population through an animal disease-control and improvement programme organised on a nation-wide scale.

"'No other country in the world needs such an animal welfare plan more badly than China,' the eminent veterinarian asserted. 'Not only from the economic point of view, but from a humanitarian standpoint as well, a standardised national programme with the close co-operation of all provincial governments will bring a material benefit of at least $100,000,000 to the farmers by the end of the first ten year period.'

"In the opinion of Dr. Rodier, such a project is financially possible in China. A National Bureau of Animal Industry, if well-organised and ably-directed, will entail an annual budget of only $1,000,000. Taking into consideration the immense results that will have been reaped as years go by, the money thus spent will be negligible. That such a scheme is feasible is deduced by Dr. Rodier from his personal experience. For with an annual budget of $250,000, he has conclusively shown the satisfactory results produced by the Kwangsi Bureau of Animal Industry in the field of animal disease control and animal improvement. Conservatively estimated, the benefit to Kwangsi farmers has been at least $200,000 in the third year.

"Called from the Philippine Islands Insular Government on May 1st, 1933, by the Kwangsi Provincial Government to devise measures for animal improvement, Dr. Rodier started to build and equip a laboratory. Since the Bureau started functioning, 200 students have graduated and have been employed in the laboratory and in the field. Mainly recruited from senior middle schools, these students were given classroom and laboratory training. Each class was divided into two sections; one half of the students were sent out to work in the field while the other half worked in the laboratory and classroom. They work alternately for one year. After graduation, all students are employed by the Bureau, either in the laboratory or in some phase of animal welfare work. Under the guidance of Dr. Rodier, the laboratory started doing experimental work on vaccines in the second year. In the third year, it was able to produce vaccines on a large scale. At present, each week, 3,000 animals in Kwangsi are protected from communicable disease by seven specially trained vaccinating crews each of which consists of one trained vaccinator and six student assistants. Such an animal disease control programme has its telling effects. Whereas Kwangsi, heretofore, lacked properly trained men for prompt suppression methods, there is now a corps of livestock inspectors who undertake quarantine, disinfection and vaccination work, under the supervision of modern four-year-trained graduate veterinarians.

"To help Kwangsi animal raisers make more money from their livestock, Dr. Rodier started to organise breeding clubs among the farmers in the livestock raising sections of the province a few months ago. Promising them that the provincial government would do all the work for them, the Bureau selected their breeding stock, castrated the unfit to prevent them from propagating their kind and furnished the clubs with the seeds of imported grains and grasses for animal forage. The Bureau then persuaded the clubs to plough up some of the grazing grounds and sowed them with the improved seeds. The plan was an instant success, as the warm climate in Kwangsi makes it possible for the cattle to crop off the forage two or three times a year. A sufficient amount of nourishing feed for the cattle is thus raised.

"It was revealed by Dr. Rodier that the two most important livestock raising centres in Kwangsi are Liuchow, in the northern part of the province, and Watlum, in the southern section. Here, 15,000 good males out of 1,500,000 cattle were picked for breeding purposes. It is the ultimate object of the bureau to bring the level of all cattle up to that of the 15,000 breeding males by the process of buying from the owners and selling at cost to the cattle clubs. Whereas the slaughter house tax hitherto collected by the Kwangsi authorities approximates the round figure of $1,000,000, he expects to see this figure doubled at the expiration of the five years that this animal welfare plan is in operation.

"Such impressive results have been materially aided by the co-operation pledged by interested organisations. In the training school for magistrates and village headmen, for instance, lectures on animal disease control, animal improvement and relation of animal diseases to human health are given. Similar training is available in the political science training division of the army. Lectures on these lines will be introduced in the Kwangsi normal schools as part of their hygiene and health habits curriculum. An effective medium employed to influence the farmers is pamphlets and posters.

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Animal and Animal Products Testing at Shanghai

In another part of the issue the same journal states that, rendering a great service to the Shanghai markets for several years past, the Government Testing Bureau of Shanghai, one

of the five testing bureaus under the auspices of the Ministry of Industry, has been steadily improving since its inauguration in March, 1929. The Animals and Animal Products Testing Department was opened in May, 1929, with the aim of developing China's export trade in animal products. Besides the inspection and testing which are its primary tasks, this section has also undertaken a number of other beneficiary projects such as investigating markets, export trades, inspecting animal products and animals, studying and improving animal products for export, guiding merchants in their manufacturing, and encouraging educational work for the improvement of the animal industry in China. The department has five major divisions: eggs and egg products testing, casings inspection, meat products inspection, hides and skins inspection, and bristle, hairwool, and feather inspection. The last mentioned division is connected with the China Veterinary Education Committee, sponsored in part by the bureau itself and various educationalists, in order that veterinary training in China—badly needed—may not be neglected.

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THE SCIENTIFIC METHOD AND OUTLOOK

We reproduce below a leading article entitled, "The Scientific Method and Outlook," which appeared in the issue of *The Lancet* for October 17th, 1936.

"Much of modern scientific research is incomprehensible not only to readers who have had no scientific training but also to the majority of scientific workers who have been brought up in another discipline. Yet many of the most striking changes in every day life originate in the work these incomprehensible papers describe. To know something of their contents most of us are compelled to peruse popular or semi-popular writings; as Dr. William George suggests,* we are in much the same position as our forefathers who from lack of Bibles or from illiteracy were obliged to base their religious beliefs on what was given them by priests. A large proportion of popular expounders of science seem to have adopted the 'absolute' view of scientific research, as if research were a means of 'getting to the bottom of things' or as if it gave a kind of superhuman or god-like knowledge which is basic or final. With this ambition to approach absolute truth or the inner reality of phenomena Dr. George has no sympathy. His attitude to science is that of the descriptivist (or as he terms it, patternist), an attitude which though comparatively new is to be found in the works of Kirchoff, Karl Pearson, and Hobson. On this view a technically verified theory is regarded as only one way of looking at the facts covered by the theory. The theory is a kind of map which helps the investigator in his action; but it is only a policy of action and not a creed of thought. On the patterning theory the task of scientific research is clearly never completed, for we cannot be sure that no one will come along with some logically sound but new way of looking at certain facts. Some at least of these logically sound ways of looking at facts are as much a part of research as is the discovery of the facts themselves. If the user of the description theory finds that mathematics helps him most to 'pattern' the kind of facts with which he deals, then, Dr. George remarks, he does not proceed to elect the Almighty the most senior of all senior wranglers, *honoris causa*. If he sees order in some selected facts he formulates a natural law but does not claim that the law was also formulated by the Creator, or say that concrete objects or events 'obey' the law. To take Dr. George's analogy we must not regard the facts of science as parts of a jigsaw puzzle which can be fitted together in only one way but rather as the pieces of a mosaic which can be fitted together in many ways. A new theory in an old subject is then a new mosaic pattern made with pieces taken from an older pattern. To speak of the one as being right and the other as wrong is, he thinks, as inappropriate to the scientific as to the artistic mosaic.

"As a patternist he rejects also the dictum that science is measurement. There are properties characteristic of a whole but not of the parts into which the whole may be divided for study. Such pattern properties seem to depend upon the totality of parts rather than upon their simple addition. Research abounds in instances of the fruitfulness of studying parts both of living organisms and of physical phenomena; but the metrical viewpoint is not all-sufficing. Scientific research has reached the stage at which the pattern idea is also needed to extend the study of the kind of things in which scientists are interested, in both biological and non-biological sciences. For example, in atomic physics the point has been reached at which purely metrical ideas have been found unsuitable for dealing with certain experimental results of measurement. It is now apparent that metrical ideas suffice for some problems but that the pattern idea of relation of parts to a whole is needed to deal with other problems, which may be called problems of the organisation or totality of the atom. In chemistry the quantitative laws of chemical combination are a result of using the measurement idea, whilst structural chemistry is a result of using the pattern idea in which the relation of parts to a whole is foremost.

"Dealing with the social applications of science Dr. George emphasises the inability of the scientific worker to determine 'shouldness.' He makes the following distinction. 'If a scientist is asked what should be done in any particular circumstances he cannot give a scientific answer. If, however, he is asked what should be done *in order to* produce some stated result then he may be able to give a scientific answer.' Unless the limits of research technique are realised by the non-scientist he will gather false impressions from the public statements of some research workers of high standing who happen also to be interested in political, social, or ethical questions. Dr. George concludes his monograph with a plea for the more extensive teaching of scientific method. Our present methods of teaching science he regards as ill adapted to favour the learning or practice of scientific method even in a particular science and still less foster the transference of a scientific outlook from one subject to another. But as scientific action comes to be more and more applied to social problems, the greater will be the need for people trained to make such applications. The teaching of scientific method in combination with a particular science, or with some subject in which its applications can be illustrated, seems to be the desideratum. These points of view selected out of many from Dr. George's own analysis of the scientific method and outlook are, we think, sufficient to show that his book is one which will interest scientists in many fields."

*The Scientist in Action: A Scientific Study of His Methods. By William H. George, M.SC., PH.D., F.INST.P., Royal Society Sorby Research Fellow and Honorary Lecturer in Physics, University of Sheffield. London: Williams & Norgate, Ltd. 1936. Pp. 355. 10s. 6d.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE ESTABLISHMENT OF A REGISTRY OF TUMOURS IN ANIMALS

To the Editor of the Veterinary Record

Sir,—I should be grateful if you would bring this request for material and help to the notice of general practitioners by inserting this letter in the correspondence column.

It is intended to form in this Institute a registry of tumours in animals. The careful compilation of such a registry of tumours obtained at operations with a subsequent follow-up of the animal concerned would prove in time an invaluable source of general information regarding tumours in animals. In addition, from the follow-up history some authoritative information would be obtained regarding the malignancy of different types of tumours and length of post-operative survival after extirpation of the highly malignant tumours. No adequate data are at present available regarding these latter important features. The voluminous literature which exists at present on tumours in domesticated animals consists mostly of detailed descriptions of the gross and macroscopic appearances.

A nucleus of this registry has already been formed from specimens obtained during the last few years and it is hoped to make some publication shortly on certain aspects of tumour pathology which have been studied (*e.g.*, on the genesis and malignancy of testicular and mammary tumours in dogs).

In order to carry out this project of a registry it would be essential for a number of practitioners to co-operate by forwarding all specimens of suspected tumours removed from animals by operation. This would involve little trouble apart from the packing and posting of the tumour to this Institute together with data regarding species, age, sex of animal and exact anatomical location of the growth. A full pathological report of the tumour would be sent free of charge on return. I should be grateful, therefore, if those practitioners who would be willing to co-operate in this way would kindly send me a postcard indicating that they wish to help.

It is believed that in time the collection of a large number of tumour slides and accurate data obtained would form an invaluable tumour museum gallery to which access would be gladly given to anyone desirous of information concerning cancer in animals or for study.

I am, Sir,
Yours faithfully,
J. R. M. Innes.

Institute of Animal Pathology,
Field Laboratories,
Milton Road,
Cambridge.
December 4th, 1936.

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VETERINARY TRAINING AND THE REQUIREMENTS OF AGRICULTURE

To the Editor of the Veterinary Record

Sir,—You will observe from the enclosed cutting* from the *West Australian* of October 30th, 1936, that the Director of Agriculture assures the public that, in default of veterinarians, the dairy advisers of his department "are quite capable of advising farmers on the treatment of common diseases of stock, and on parturition troubles, sprains, impaction, treatment of wounds, vaginitis, paralysis, &c."

He further implies, in terms so free from ambiguity as to amount to a positive statement, that qualified veterinarians are only concerned with "disease of an epidemic character, and the investigation of obscure stock diseases."

The immediate reactions of the average veterinarian to these observations will probably be similar to my own, namely, indignation and disgust, but reflection leaves one less sure that the Director of Agriculture was wholly wrong. He is wrong, of course, about the "quite capable" qualification of the dairy adviser, but it is perhaps doubtful whether an ever-extending scientific and academic training is not producing skilled veterinary bacteriologists rather than true veterinary clinicians, and that our new graduates might be considered to be not "quite capable" of the same clinical duties: parturition, for instance.

It seems to me, in short, that in these utterances of the responsible Department for Agriculture in a vast State, there is a degree of Nemesis. We have set our academic standards by those of the bacteriologist and nothing much less than he is to be worth paying as a veterinarian in public service. Are we not getting exactly that for which we have asked? Our veterinary schools are set in the middle of great cities with few or no practical facilities whereby our students may acquire the experience of the dairy advisers of Australia and New Zealand. Even the student who conscientiously "sees practice" in Britain to-day is likely to see more of cats and dogs than of cows and sheep. Few of them are trained in that dexterity and art which rightly made many of the older veterinarians, some "College men" and some not, the indispensable helpers of so many farmers in so many surgical ways. To-day it is claimed by the Director of Agriculture in Western Australia that his dairy advisers can do these simple things as well as the elegant and expensive product of our schools and how shall we set about proving that he is wrong?

What of the future? Is it too late to move one of our schools to the country and run it in conjunction with a big farm where practical veterinarians might be trained, of a sort willing to work for a starting salary of about £300 a year in the Dominions? Or must all the schools be maintained for the production of a few costly bacteriologists and officials until such time as they have solved the mysteries of the "obscure stock diseases" and the dairy advisers can carry on the good work without veterinarians at all? Has a ghastly error been made in pouring out money to build in the middle of London an enormous school remote from Nature where in effect only dog-doctors and bacteriologists can be practically trained?

Personally, I think that the observations of the Director of Agriculture are the handwriting on the wall of our fate as a rural and practical calling and that this position has arisen as the result of our academic concentration in cities. It may be argued that the loss of our humbler functions was a fair price to pay for our eminence in research, but can we claim eminence in research?

Yours faithfully,
Wakefield Rainey.

Kalamunda,
Western Australia.

*Following is our correspondent's enclosure from the *West Australian*:—

Veterinary Advice: The Departmental Attitude

"Recently the Secretary of the dairying section of the Primary Producers' Association (Mr. J. T. Davies) wrote to the Director of Agriculture (Mr. G. L. Sutton) as follows: 'Our branch at Margaret River desires us to draw attention to the dearth of veterinary surgeons. They point out that the nearest one is about 60 miles away, which is very unsatisfactory from the point of view of the stock owners of the district. They suggest that the Government be urged to assist in the training of young men for veterinary work, preference to be given to farmers' sons. In the meantime, consideration to be given to the matter of obtaining veterinary surgeons from overseas.'

"Mr. Sutton has now replied in the following terms: 'In reply to your letter of October 9th I shall be glad if you will point out to your Margaret River branch that my Minister is very desirous of taking steps to overcome the shortage of veterinary surgeons in this State, and already has been moving in certain directions, but unfortunately finality has not yet been reached. Recently, however, he arranged for a special veterinary course to be held at the Muresk Agricultural College, and to this farmers and farmers' sons were especially invited. I am pleased to say there was a very good response.

"'With regard to the training of farmers' sons for veterinary work, it is necessary to point out that it is essential that those who desire to take up study for the degree of veterinary science shall have first passed the Leaving examination. The question of obtaining veterinary surgeons from overseas has also been considered.

"'I am somewhat doubtful as to whether the problems your settlers have in mind would come within the sphere of a departmental veterinary officer stationed in the district referred to, who would be concerned not with treating stock complaints of individual settlers, but more particularly with disease of an epidemic character, and the investigation of obscure stock diseases. I feel that many of the troubles and difficulties with which the settlers are faced in connection with their stock could be dealt with by our dairy advisers. A dairy adviser is stationed at the Vasse, and there are also grade herd recorders at Rosa Brook and Forrest Grove. These officers are quite capable of advising farmers on the treatment of common diseases of stock, and on parturition troubles, sprains, impaction, treatment of wounds, vaginitis, paralysis, &c.'"

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ELECTRIC SCHOCK

To the Editor of the Veterinary Record

Sir,—I am afraid that it is a case of the "fool rushing in," &c., but I would ask why, in all the interesting letters started by my friend Captain Motton on electric shock, has there been no mention of the amp. The letters have made reference only to volts which I understand have very little bearing on the matter, at any rate as compared with amps. Incidentally, I know of a man who was using a crowbar and accidentally touched a cable carrying 27,000 volts of *very high amperage* and "who got away with it," although hit very hard. Unfortunately, he recovered more quickly than did his temper. He picked up the bar again and attacked the cable in revenge but this time he was "counted out."

Yours faithfully,
W. G. Blackwell.

1, Exview,
Exmouth.
December 8th, 1936.

The Editor acknowledges, with thanks, the receipt of the following:—

Communications from Mr. H. Burrow (Derby), Mr. F. A. Davidson (Stafford), Dr. J. R. M. Innes (Cambridge), Major-General Sir John Moore (London), Captain J. Smith (Kenley) and Colonel G. K. Walker (Abingdon).

Report of a meeting of the Midland Counties Division, N.V.M.A., from Captain H. W. Dawes, Hon. Secretary.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Out-breaks con-firmed.	Animals attacked.	Out-breaks con-firmed.	Animals slaugh-tered as diseased or ex-posed to infection.	Out-breaks reported by the Local Authori-ties.	Animals attacked.	Out-breaks con-firmed.	Out-breaks con-firmed.	Swine slaugh-tered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 16th to 30th Nov., 1936	17	21	15	883	2	2	17	72	34
Corresponding period in									
1935	18	18	2	163	1	1	43	86	76
1934	22	24	9	1,405	3	5	45	103	42
1933	11	11	—	—	3	4	71	55	56
Total 1st January to 30th November, 1936	405	478	38	3,609	101	243	201	1,755	1,199
Corresponding period in									
1935	338	391	50	11,787	92	211	382	1,862	1,139
1934	355	401	61	7,653	109	181	587	1,631	916
1933	268	314	87	7,805	125	213	435	1,296	857

Note.—The figures for the current year are approximate only. § Excluding outbreaks in Army Horses.